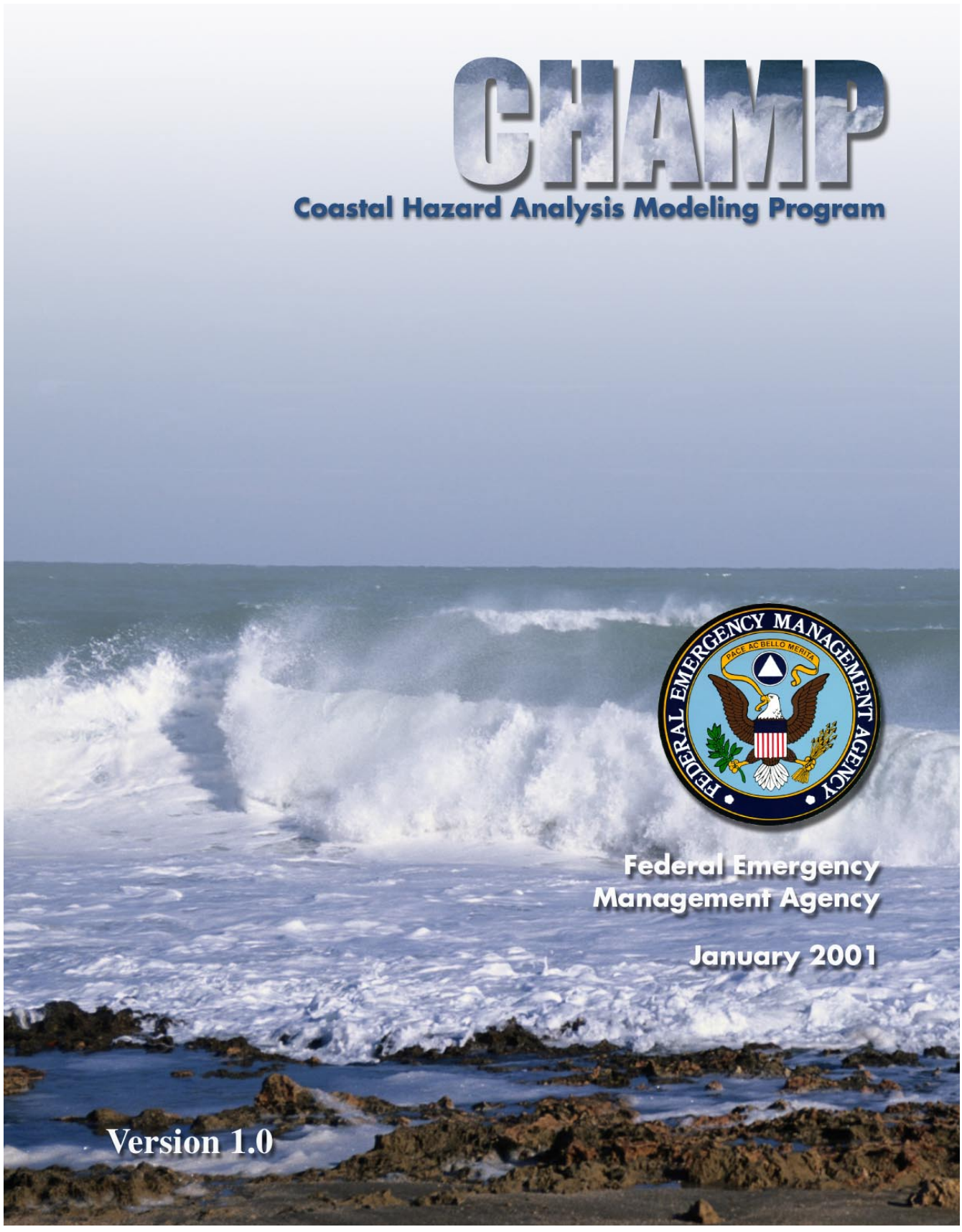
CHAMP

Coastal Hazard Analysis Modeling Program



Federal Emergency Management Agency

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Version 1.0

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Chapter 1: Introduction

1.1 What is the Coastal Hazard Analysis Modeling Program (CHAMP)?

Since the 1970s, the Federal Emergency Management Agency (FEMA) has routinely established and updated standard methodologies for performing coastal hazard assessments of fine scale wave phenomena associated with hurricane storm surges or northeaster flooding effects. These methodologies include storm-induced erosion treatments, wave height analyses, and wave runup analyses. The storm-induced erosion treatment adopted by FEMA in 1988 is a schematic treatment of expected erosion quantities and geometries; this treatment is performed manually by engineers. There are two existing FEMA computer programs for wave height analysis: the 1989 Wave Height Analysis for Flood Insurance Studies (WHAFIS 3.0) program and the 1991 wave runup analysis (RUNUP 2.0) program. Both are DOS-based versions. These analyses establish the wave crest elevation (1% annual-chance stillwater elevation [SWEL] plus wave height) and wave runup elevation (SWEL plus wave runup depth) at each representative transect along the coast. The final results are then used to map coastal flood hazards on the Flood Insurance Rate Map (FIRM).

These coastal hazard assessments must be performed separately for each transect, and there is no graphical interface through which an engineer can collectively review the results obtained from these assessments. Combining the results of the individual assessments into a per transect graphic display of the respective flood hazard zones and base (1% annual chance) flood elevations (BFEs) (the wave envelope) is typically plotted by hand or done with a spreadsheet. Often, changing a single input parameter can mean that all three assessments must be re-run, and the results replotted. This process is cumbersome and time-consuming. As part of FEMA's map modernization efforts, this process has been updated.

CHAMP is a Windows-interfaced Visual Basic language program that allows the user to enter data, perform coastal engineering analyses, visualize and tabulate results, and chart summary information for each transect within a user-friendly graphical interface. With CHAMP, the user can import digital elevation data; perform storm-induced erosion treatments, wave height analyses, and wave runup analyses; plot summary graphics of the results; and create summary tables and reports in a single environment.

With this User's Manual, we are releasing Version 1.0 of CHAMP for use by FEMA offices, study contractors, and coastal engineering firms. Please be advised that this User's Manual has been formatted and developed for direct application with this CHAMP Version 1.0 release and is, therefore, subject to some changes and limitations. These limitations include:

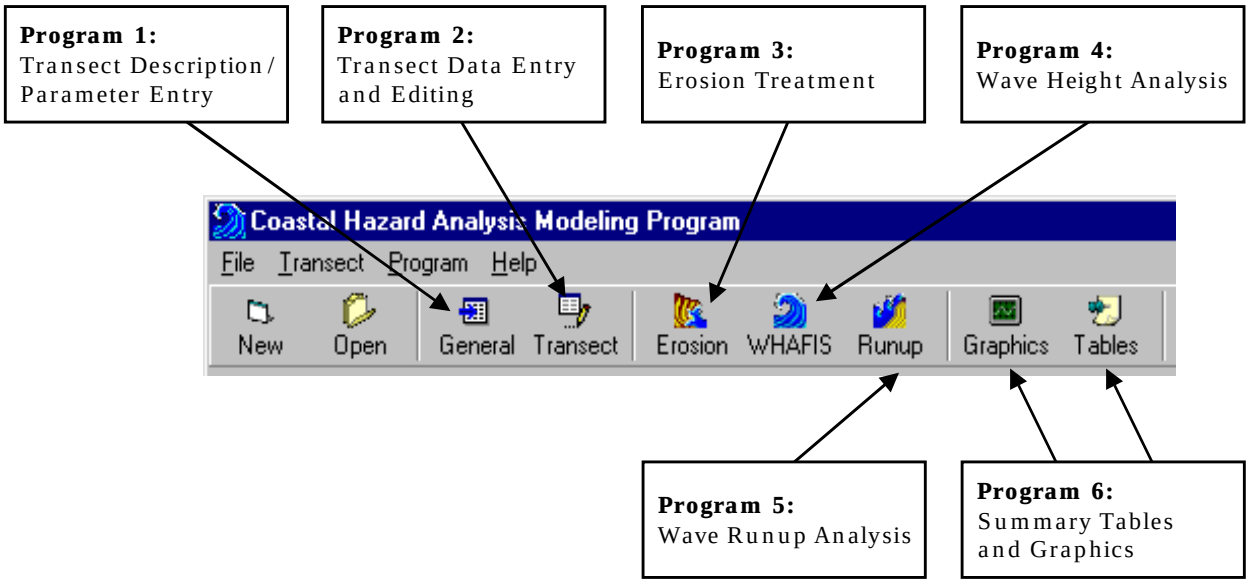
- CHAMP is designed to be used only on IBM-compatible PCs with either Microsoft Windows 95, 98, 2000 or NT operating systems.
- CHAMP should be applied only to the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico coastal regions for coastal flood hazard assessments relative to the National Flood Insurance Program.

- Existing WHAFIS and RUNUP input files cannot be imported directly into CHAMP. Data associated with these files need to be reentered into the initial Data Entry Program and respective model applications.
- CHAMP follows a "linear" orientation of coastal analyses. Any editing or addition/deletion of data is not automatically saved in the preceding programs.
- Automated mapping features associated with the CHAMP software have not been fully developed. The graphics can be saved as a .dxf file for use with other CADD or GIS applications.

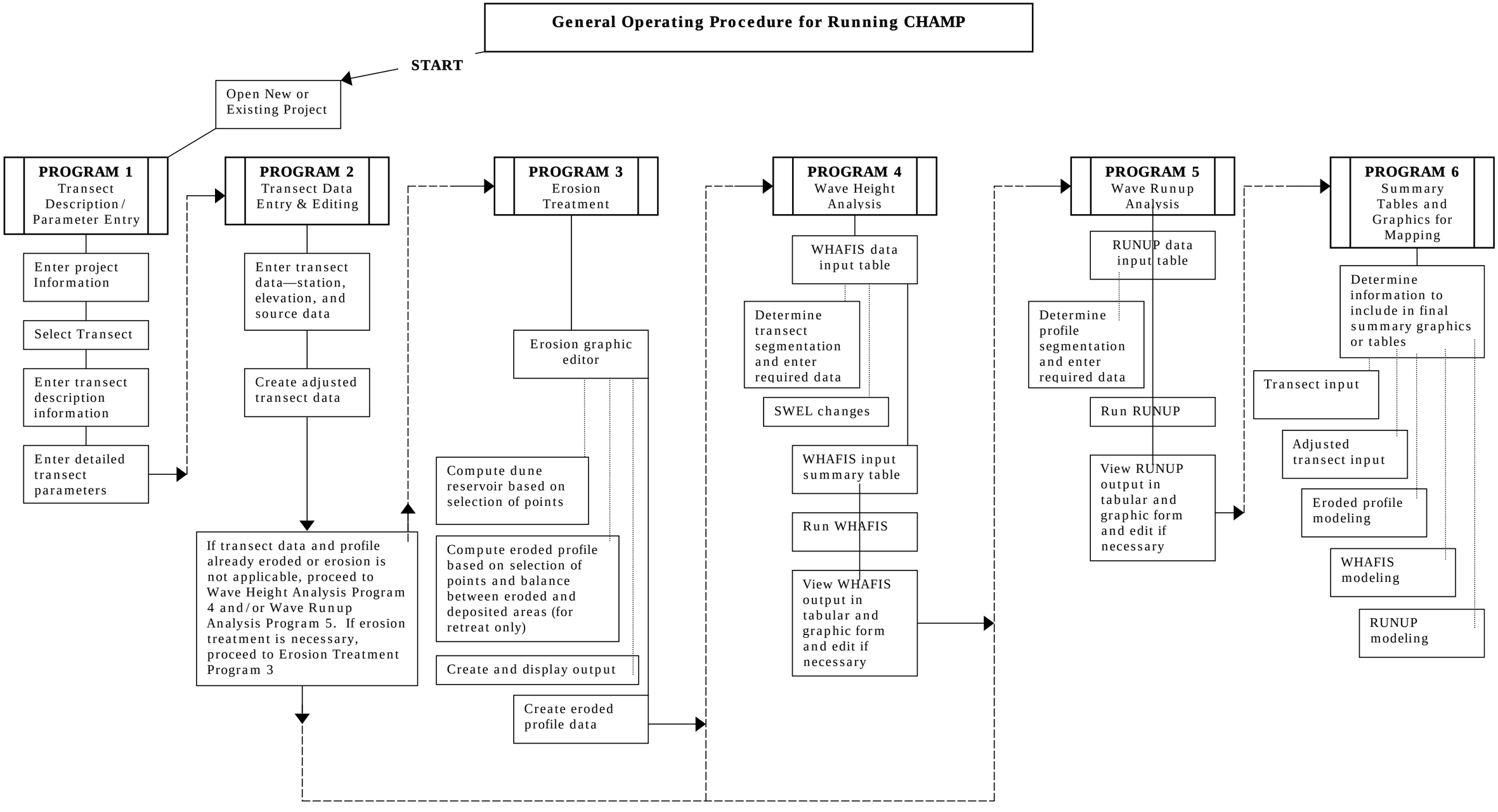
CHAMP is composed of six programs, each of which includes a main operational component to perform coastal flood hazard assessments and to identify flood zones. These six programs include:

- Program 1: Transect Description/Parameter Entry
- Program 2: Transect Data Entry and Editing
- Program 3: Erosion Treatment (if applicable)
- Program 4: Wave Height Analysis
- Program 5: Wave Runup Analysis
- Program 6: Summary Tables and Graphics for Mapping

These programs appear on the CHAMP **Main Menu Button Bar** as follows:



The flowchart on the following page outlines the general operating procedures for running CHAMP. Detailed instructions and flowcharts for setting up and running CHAMP and its six operational programs are included in Chapter 3 (Running CHAMP) and Chapter 4 (Program Operation).


General Operating Procedure for Running CHAMP
START
Open New or Existing Project
PROGRAM 1 Transect Description/ Parameter Entry
Enter project Information
Select Transect
Enter transect description information
Enter detailed transect parameters
PROGRAM 2 Transect Data Entry & Editing
Enter transect data—station, elevation, and source data
Create adjusted transect data
If transect data and profile already eroded or erosion is not applicable, proceed to Wave Height Analysis Program 4 and/or Wave Runup Analysis Program 5. If erosion treatment is necessary, proceed to Erosion Treatment Program 3
PROGRAM 3 Erosion Treatment
Erosion graphic editor
Compute dune reservoir based on selection of points
Compute eroded profile based on selection of points and balance between eroded and deposited areas (for retreat only)
Create and display output
Create eroded profile data
PROGRAM 4 Wave Height Analysis
WHAFIS data input table
Determine transect segmentation and enter required data
SWEL changes
WHAFIS input summary table
Run WHAFIS
View WHAFIS output in tabular and graphic form and edit if necessary
PROGRAM 5 Wave Runup Analysis
RUNUP data input table
Determine profile segmentation and enter required data
Run RUNUP
View RUNUP output in tabular and graphic form and edit if necessary
PROGRAM 6 Summary Tables and Graphics for Mapping
Determine information to include in final summary graphics or tables
Transect input
Adjusted transect input
Eroded profile modeling
WHAFIS modeling
RUNUP modeling

1.2 How To Use this User's Manual

This User's Manual contains the instructions and specifications needed to run CHAMP successfully. Prior to running CHAMP for the first time, users should:

- Have a good understanding of FEMA's coastal flood hazard mapping program and the procedures for updating and revising a Flood Insurance Study (FIS) and FIRM;
- Have a good understanding of and demonstrated expertise in coastal engineering analyses, including storm-induced erosion, storm surge flooding, wave height generation and attenuation, wave runup, and wave overtopping. The theory and procedures for these analyses are detailed in the Guidelines and Specifications for Wave Elevation Determination and V-Zone Mapping – Final Draft (G&S) (March 1995); this document will be referred to as G&S throughout this User's Manual;
- Be familiar with the functions and assumptions of FEMA's WHAFIS 3.0 and RUNUP 2.0 programs, and their respective user manuals;
- Be familiar with the Microsoft Windows 95/98/2000/NT environment; and
- Be familiar with the operation of a CADD program.

This manual takes the user through the program using many illustrations of the various menus, input screens, and results screens. After reading the manual, the user should be ready to start using the program. Throughout the manual, the user is asked to select items from pull-down menus or click on objects. Unless otherwise noted, the user should left-click to select an item.

The text of certain CHAMP operational features has been enhanced to help the user. Enhanced text features include:

- **Main Menu Button Bar Icons** are placed in a box and in bold;
- Command Buttons are placed in a box and not bold;
- Text Fields and pull-down menu items are underlined; and
- **Windows** are in bold.

1.3 Acknowledgments

CHAMP was designed and developed by Dewberry & Davis LLC for FEMA.

Chapter 2: Installing CHAMP

CHAMP is a program written in Visual BASIC. This chapter contains the following sections:

- Program Specifications
- System Requirements
- Installation Procedures

2.1 Program Specifications

CHAMP is a stand-alone, menu-driven Microsoft Windows-based program written in Visual BASIC. CHAMP comes on a CD-ROM, which includes the program, utilities, data components, user's manual and the G&S.

2.2 System Requirements

The minimum requirements for installing and running CHAMP include:

- IBM-compatible PC (a 100 mHz or higher processor is recommended)
- Microsoft Windows 95, 98, 2000 or NT Operating System

2.3 Installation Procedures

The instructions for installing CHAMP are as follows:

1. Insert the CHAMP CD or locate where you have the installation files.

2. All open applications should be closed to ensure a successful installation.

3. Double-click on "SETUP.EXE" and respond to all prompts from the program. CHAMP will be installed to the "C:\Program Files\CHAMP" directory automatically. CHAMP should **not** be installed on a network drive as running CHAMP from a network may cause it to run improperly.

   If a question comes up asking if a file should be replaced by a newer version, the user needs to make sure that replacing the older file will not affect the operation of another program. Also, CHAMP may not run properly if the user keeps older versions of the files to be replaced. Users should consult with the system administrator if they are unsure.

4. To open CHAMP, click Start on the Program Manager window; go to the Programs selection; and click on "CHAMP." This will bring you to the CHAMP initial splash screen.

NOTE: Sample data are provided in the "Samples" folder, which is accessible by clicking Open on the **Main Menu Button Bar**.

Chapter 3: Running CHAMP

This chapter outlines the program capabilities of CHAMP. It describes the following components of CHAMP:

- File Organization
- **Main Menu Button Bar** Description
- Getting Started

3.1 File Organization

To organize general project information and transect data, CHAMP generates one .mdb file (MS Access database file). To maintain data integrity, the user does not have direct access to the .mdb file. Transect data files for WHAFIS and RUNUP are stored in a subfolder with the same name as the .mdb file. WHAFIS data and output file names begin with the prefix "W" followed by the name assigned to the transect. For example, transect 3 in CHAMP will have input and output files named W3.dat and W3.out, respectively. RUNUP files follow the same syntax except the prefix is "R." WHAFIS and RUNUP file names are relatively short because both programs operate on a DOS platform, **which accepts file names of no more than eight characters**. Each time WHAFIS or RUNUP is executed, the output files are overwritten.

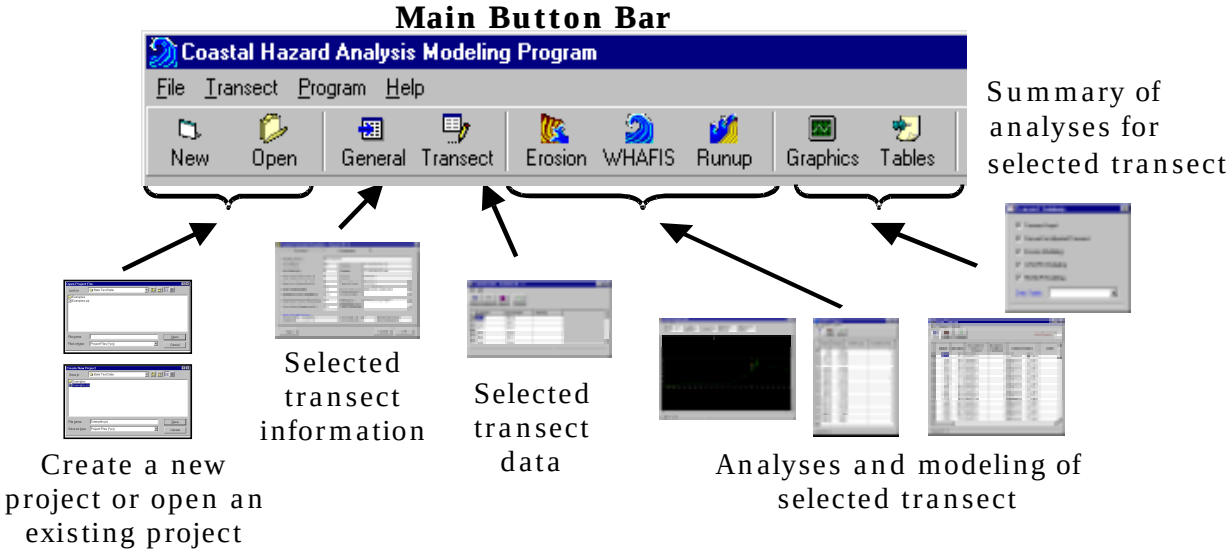
The following example is for a project named "Simple Coast," with two transects, stored in the root X directory:

Directory	Name	Type
X:\	Simple Coast.mdb	MS Access Database
	Simple Coast\	File Folder
X:\Simple Coast\	R1.dat	DAT File
	R1.out	OUT File
	R2.dat	DAT File
	R2.out	OUT File
	W1.dat	DAT File
	W1.out	OUT File
	W2.dat	DAT File
	W2.out	OUT File
	1.dxf	Graphic file
	2.dxf	Graphic file

To avoid overwriting an existing project file, it is recommended that the user create a unique folder name (which should not be changed) for each project or that the user store the files on diskette.

3.2 Main Menu Button Bar Description

After opening CHAMP, and then clicking Start on the initial splash screen, the **Main Menu** window including the **Main Menu Button Bar** will appear. The **Main Menu Button Bar**, shown below, is the main graphical interface of CHAMP and allows the user to access the programs in a logical sequence.



3.3 Getting Started

To load an existing project or create a new project, and enter all necessary data, the following seven steps must be performed.

Enter project information:

- Step 1. Create a new project, or load an existing project.
- Step 2. Enter general project information—select a transect for data entry/editing.

Enter transect information:

- Step 3. Enter/edit general information for the selected transect.
- Step 4. Enter station and elevation data for the selected transect.
- Step 5. Adjust transect reference station to zero elevation; this is required to create necessary data tables for input to erosion analyses and wave modeling.
- Step 6. Return to main project window and repeat steps 3 through 5 for each additional transect.
- Step 7. Go to Erosion Assessment, WHAFIS, RUNUP for analyses and modeling of selected transect.

These seven steps are detailed in Chapter 4 and in the flowchart titled "Project and Transect Data Entry Procedures" at the end of section 4.2. Before the Erosion Assessment, WHAFIS, RUNUP, and Summary Programs can be accessed, all of the information for Program 1: Transect Description/Parameter Entry and Program 2: Transect Data Entry and Editing must be completed. After entering the initial

transect data in Programs 1 and 2, other elements in Programs 3 through 6 can be utilized by clicking on the respective buttons.

Chapter 4: Program Operation

This chapter provides an overview of the transect data set up, coastal engineering analysis and modeling, and summary graphical display components of CHAMP. There are two programs for the transect data setup, three programs that make up the analysis portion, and a final program to display summary tables and graphs:

- Program 1: General Transect Description and Parameter Entry
- Program 2: Transect Data Entry and Editing
- Program 3: Erosion Treatment (if applicable)
- Program 4: Wave Height Analysis
- Program 5: Wave Runup Analysis
- Program 6: Summary Tables and Graphics for Mapping

4.1 Program 1: General Transect Description and Parameters

1. Load a Project

   To create a new project:

   a. Click NEW on the **Main Menu Button Bar** (or choose New Project from the File drop-down menu).
   b. Select/create the folder to store the CHAMP files.
   c. Enter the File Name, which will create a .mdb file, and data folder with the same name and click Save.

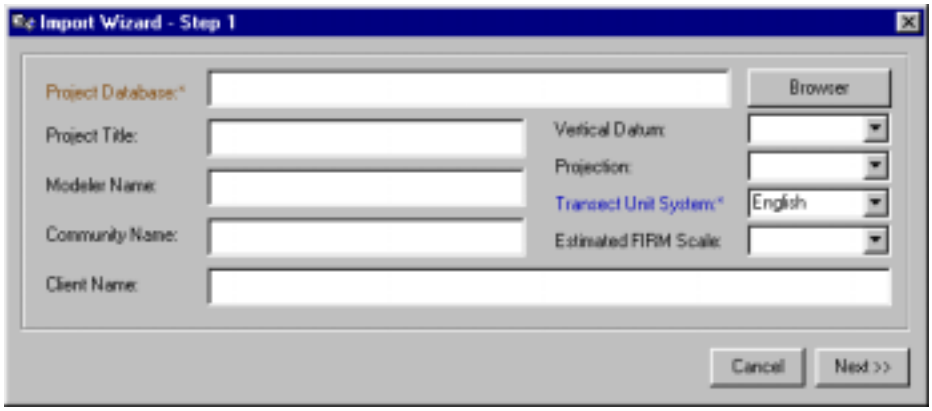
   To open an existing project:

   a. Click OPEN on the **Main Menu Button Bar** (or choose Open Project from the File drop-down menu).
   b. Go to the folder containing the .mdb file for the project.
   c. Select and open the .mdb file.

> Existing projects created in previous versions of CHAMP can also be opened using this new version. CHAMP will convert the file to the newer version format. Be sure to back up the older CHAMP version project files before opening in the new version to prevent any accidental data loss.

2. To import multiple transect data:

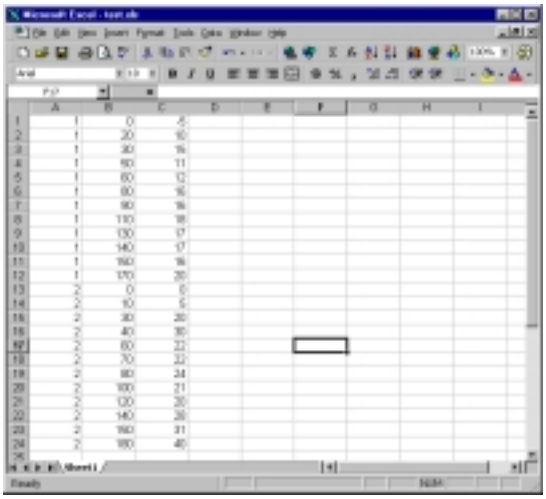
   a. Choose Import Data from the File drop-down menu. The following window will appear:



b. STEP 1: Click on the BROWSER button to select a file name and location for the new project. Then fill in the appropriate project information. Click on NEXT to move on.

c. STEP 2: Select the BROWSER button to select the file where the transect data are located. The files that can be imported are standard comma-delimited text files (.csv), MS Excel (.xls), dBASE (.dbf), and MS Access (.mdb) that contain transect numbers and station/elevation pairs. If databases or spreadsheets contain multiple tables or worksheets, select the data table or worksheet with the transect data you wish to import. All data must be in one data table or worksheet. Only one data table or worksheet can be imported. Select the data type, and then select the data field that contains that particular data type. If you are not sure what is contained in the data fields, a display of the first few rows of the data are shown. Transect, Station, and Elevation are the only required fields. The source field is not required to import data.

The data file with the transect information needs to be arranged as shown below in order for the data to import properly. One column or field needs



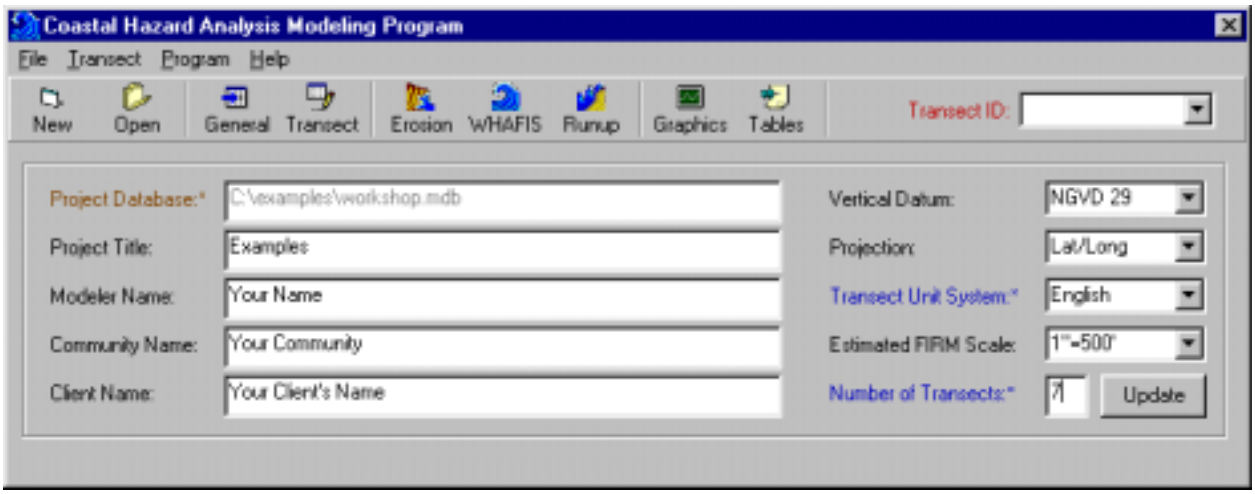
to have the transect numbers that each station/elevation pair is related to. That is, each data point must have an associated transect number.

There must also not be any blank rows separating transects or data points and no text title rows.

The transect data that are imported can be filtered by the change in slope along the profile. Enter in the minimal absolute angle (in degrees) allowed between any three consecutive data points. If the angle made by the three points is less than the given angle, the middle point will be removed from the imported transect. A value of zero in this field means that no data will be filtered and all data points will be imported.

Once all the appropriate data are selected, click the OK button to import the transect data and create the project.

3. Enter General Project Information



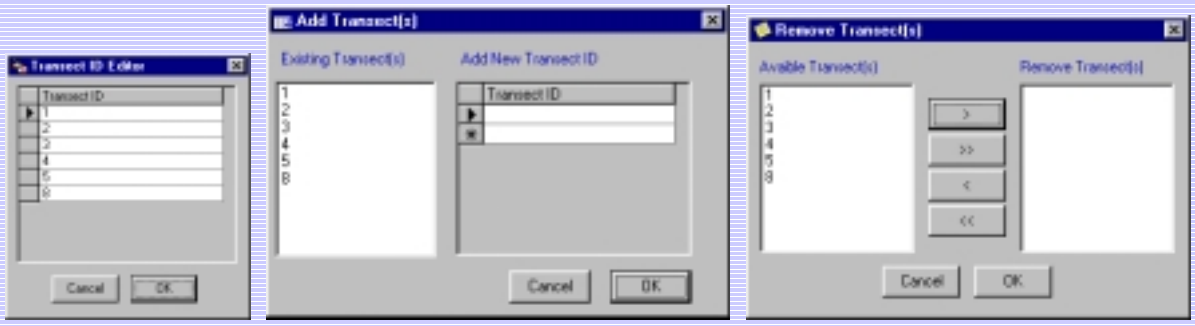
After loading the project, the main **Project Information** window will appear. These fields will be used in the WHAFIS and RUNUP programs for the title block. The path and name of the .mdb file are visible in the Project Database field; however, the user cannot modify this field.

- Project Title: User-specified to sufficiently identify the project site.
- Modeler Name: Self-explanatory.
- Community Name: Name of community to which this analysis is being applied. Should be the same as the community name on the FIRM.
- Client Name: Self-explanatory.
- Vertical Datum: All project data should reference the same vertical datum used for the FIRM. Currently, the user has only two choices for vertical datum. These are the North American Vertical Datum of 1988 (NAVD 88) and the National Geodetic Vertical Datum of 1929 (NGVD 29). This field, as well as the Projection and Estimated FIRM Scale fields, will be used for automated mapping, which will be developed in future versions of CHAMP.
- Projection: Same requirements apply as for vertical datum. The choices are currently Latitude/Longitude, State Plane, and Universal Transverse Mercator, also known as UTM.
- Transect Unit System: English (feet) or Metric (meters).
- Estimated FIRM Scale: Anticipated scale of the FIRM to be created. Current options include (1 inch = x feet) 400, 500, 800, 1000, and 2000.
- Number of Transects: This field establishes the number of transect files that will be opened for data entry. The user can increase the number of transects at any time.

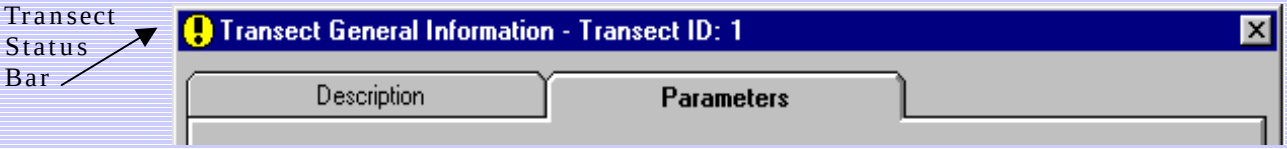
After entering/editing data, click on the pull down menu in the upper right hand corner of the window labeled Transect ID to select a transect. To run the Erosion Treatment, Wave Height Analysis, and Wave Runup Computation programs in CHAMP, the user must first create and/or select a transect to be analyzed.

To add, delete, or rename a transect to an existing list, follow these steps:

From the main **Project Information** window, click the Transect menu. Here there are three items: Edit Transect ID, Add Transect, and Delete Transect. Selecting any one brings up a new window where transects can be added, deleted or renamed. Transect ID's can be letters or numbers, up to 15 characters.

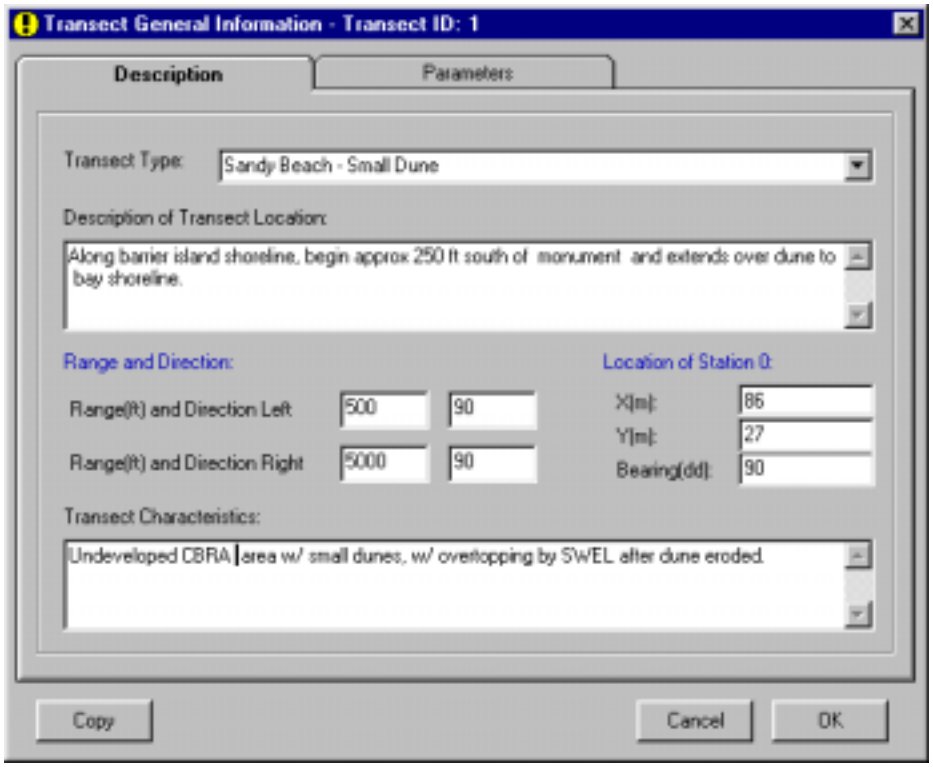


The user can determine which transect is selected by viewing the **Transect Status Bar** located along the top of any program window.



4. Enter General Transect Information

In the **Transect General Information** window, information about the location, type, and general characteristics of the selected transect is entered/edited. Click on the General button on the main **Project Information** window to open the **Transect General Information** window:



The **Description** tab is for entering general transect information as follows:

- Transect Type: Description of the shoreline type that most closely matches the transect being modeled. Current choices are Rocky bluff, Sandy bluff-Little

beach, Sandy beach-Small dune, Sandy beach-Large dune, Open wetland, Vertical wall, and Revetment.

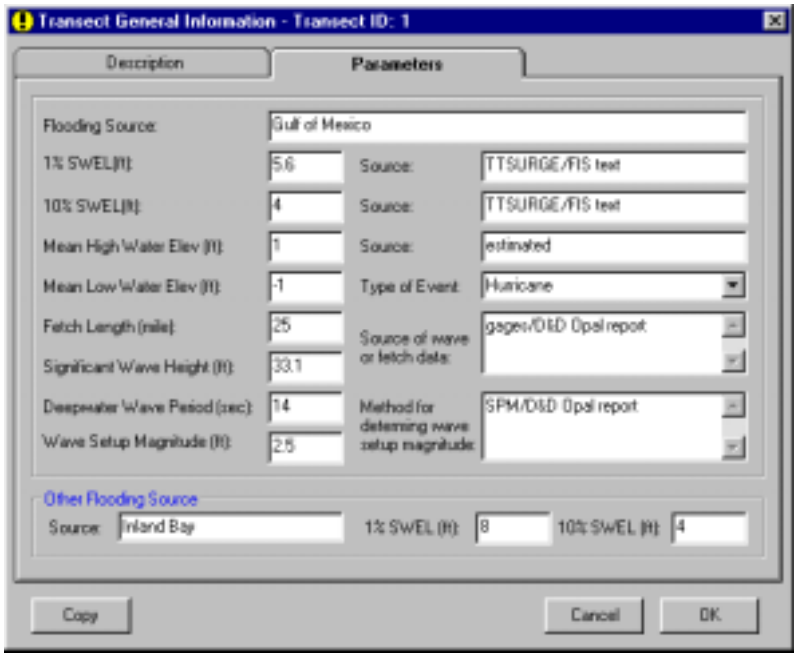
- Description of Transect Location: Description of the transect's location relative to local fixed landmarks. The description should be adequate for unmodified inclusion in FIS tables.
- Range and Direction Left: Looking landward, the Range is the along-shore distance to the left of the transect line that the transect is intended to represent. Direction is entered as the bearing of the range away from the transect (in degrees North).
- Range and Direction Right: Same as Range and Direction Left, but to the right of the transect line.
- Location of Station 0: Description of the location of the "zero" station to be entered in the transect profile data. The zero station should be located at the zero elevation or zero-foot contour line along the shoreline of the flooding source. The unit options for these fields include decimal degrees (dd), meters (m), and feet (ft) based on the Projection field input in the main **Project Information** window. The bearing refers to the orientation of the transect looking landward from Station 0. The unit option for this field is limited to decimal degrees.
- Transect Characteristics: Physical and cultural description of the area the transect is intended to represent. Include information on the presence vegetation, structures or development, and beach material (fine sand, coarse sand, cobble, or mud).

None of the fields described above are required to proceed to the next step; none of the information provided in the **Transect Description Information** window will be used for actual engineering computations.

If entering information for a new transect and a previous transect exists that contains the same information as the new transect, click on the Copy button to fill in all the fields with information from a previously entered transect.

5. Enter Detailed Transect Information

Click on the **Parameters** tab in the **Transect General Information** window for entering additional details regarding the transect.



Detailed transect information regarding storm surge and wave parameters and the source of the data are entered in the **Parameters—Transect General Information** window. Units for the majority of the data fields are established in the main **Project Information** window. For Version 1.0 of CHAMP, the units in the data fields default to English. In future versions, the units will be in English or Metric.

The following fields are required and must be completed (with the exception of Other Flooding Source, which is optional):

- Flooding Source: Name of the body of water for which flood hazards are being analyzed (e.g., Atlantic Ocean, Gulf of Mexico, or inland bay or sound).
- 1% Annual Chance Stillwater Elevation: 1% annual chance (100-year) stillwater elevation without wave setup, referenced to the stated vertical datum. Also referred to as "storm surge." Computed wave setup will be entered separately. It is important to use a decimal format with one decimal digit (tenths) in this field.

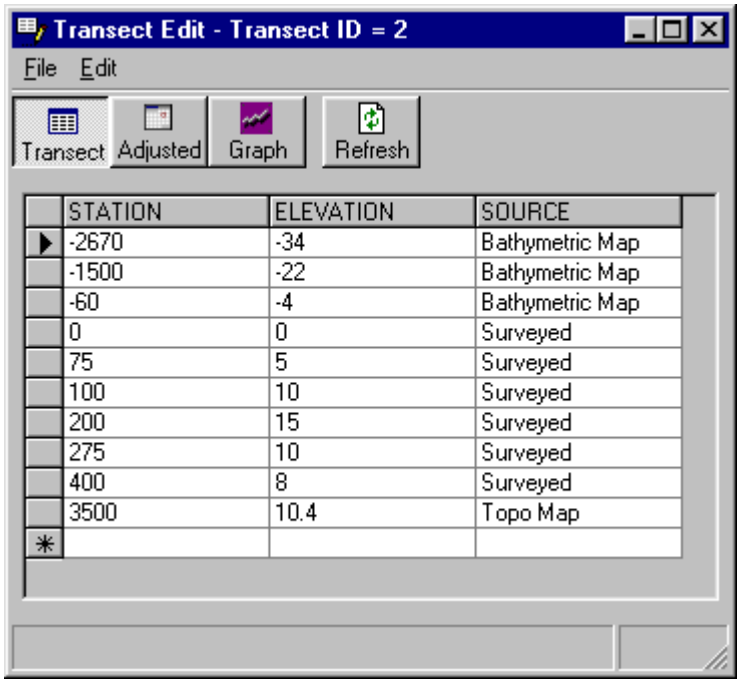
- 10% Annual Chance Stillwater Elevation: 10% annual chance (10-year) stillwater elevation without wave setup, referenced to the stated vertical datum. Must be specified, even if value is "zero."
- Mean High Water Elevation and Mean Low Water Elevation: Referenced to the stated vertical datum. Must be specified, even if value is "zero."
- Fetch Length: Measured in miles, the maximum open water reach over which storm-induced winds are expected to occur. Maximum effective value is 24 miles. A "zero" can be entered if deepwater wave conditions are specified.
- Significant Wave Height: Wave height associated with the 1% annual chance storm event, given in feet. Must be specified for WHAFIS 3.0 and RUNUP 2.0 analyses. A "zero" can be entered if the subject area has a restricted fetch and the Fetch Length will be used to calculate a wave height.
- Deepwater Wave Period: Wave period associated with the 1% annual chance deepwater wave height. Required for WHAFIS 3.0 and RUNUP 2.0 analyses. A "zero" can be entered if the subject area has a restricted fetch and the Fetch Length will be used to calculate a wave period.
- Wave Setup: Value, in feet, of apparent wave setup effect to be added to 1% annual chance stillwater elevation. Must be specified, even if value is "zero."
- Source of 1% Annual Chance Stillwater Elevation: Description of methods or references used to determine 1% annual chance stillwater elevation.
- Source of 10% Annual Chance Stillwater Elevation: Description of the methods or references used for determining the 10% annual chance stillwater elevation.
- Source of Mean High and Low Water Elevations: Description of the methods or references used for determining specified mean high water (MHW) and mean low water (MLW) elevations.
- Type of Event: Description of the type of flooding event being analyzed. Drop-down list includes such options as Northeaster and Hurricane.
- Source of Wave or Fetch Data: Description of methods or references for determining wave or fetch conditions.
- Method for Determining Wave Setup Magnitude: Description of methods or references used for determining wave setup magnitude.

The Other Flooding Source data fields at the bottom of window are optional. They can be used to enter information about a flooding source not related to the main flooding source as a transect traverses landward. An example of this is when there is a barrier island with a body of water between the island and the mainland.

Click OK to return to the main **Project Information** window, or click the close button (X).

4.2 Program 2: Transect Data Entry and Editing

The **Transect Edit Program** window can be opened by clicking the TRANSECT button on the **Main Menu Button Bar**. Transect ground profile station and elevation data are entered here. The data can be the unadjusted, non-eroded profile information or eroded profile information and will be used in all analyses and modeling programs. For this version of CHAMP, all station and elevation data for the transect must be in feet.



	STATION	ELEVATION	SOURCE
▶	-2670	-34	Bathymetric Map
	-1500	-22	Bathymetric Map
	-60	-4	Bathymetric Map
	0	0	Surveyed
	75	5	Surveyed
	100	10	Surveyed
	200	15	Surveyed
	275	10	Surveyed
	400	8	Surveyed
	3500	10.4	Topo Map
*			

Transect station and elevation data can also be imported by selecting the Import menu item under the File menu. CHAMP only allows importing comma-delimited text files (.csv) for importing station and elevation data for a transect. This works much the same as importing project data described above.

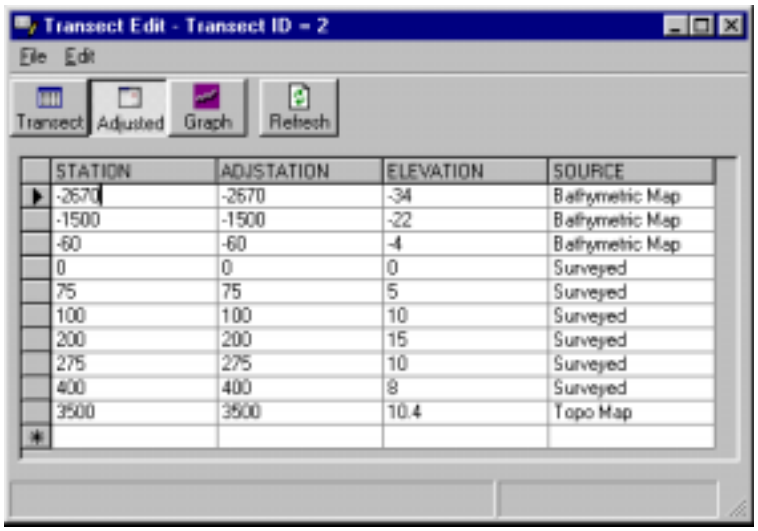
The Station and Elevation column data must extend seaward to at least the zero shoreline. However, it is often necessary for the data to extend much further offshore if dune-retreat-eroded-profile transects or wave runup are to be modeled. Profile data should extend onshore (inland) to a point where coastal stillwater flooding likely ceases or to the limit of maximum runup elevation.

The Source column lists the source of the transect profile data. Options for this column include Surveyed, Topographic Map, Bathymetric Map, Global Positioning System (GPS), Digital Terrain Metadata (DTM), and Light Detection and Ranging (LIDAR) data.

To enter additional station/elevation data points, enter data at the row indicated by the * located at the bottom left corner of the input data fields.

Command buttons at the top of the **Transect Edit Program** window include:

- Transect: Displays **Transect Edit** window
- Adjusted: Displays **Adjusted Transect Edit** window. Using this button creates the adjusted station-elevation table in the database, which will be used by the other programs. If this table is not created, the other programs cannot be run. If a (0,0) point is not available, this button adjusts the profile accordingly by interpolating or adding a zero elevation (NGVD 29 or NAVD 88) and corresponding station, which is required by WHAFIS. Notice that this dialog box is similar to the **Transect Edit** window, except for the addition of the Adjusted Station column. This column displays the *interpolated* (0,0) shoreline point, if such a point was not a part of the original transect data. The Source column contains the text "interpolated" for the interpolated (0,0) point.



STATION	ADJSTATION	ELEVATION	SOURCE
-2670	-2670	-34	Bathymetric Map
-1500	-1500	-22	Bathymetric Map
-60	-60	-4	Bathymetric Map
0	0	0	Surveyed
75	75	5	Surveyed
100	100	10	Surveyed
200	200	15	Surveyed
275	275	10	Surveyed
400	400	8	Surveyed
3500	3500	10.4	Topo Map

- Graph: Displays either the transect or adjusted transect data in graphical format depending on which table is displayed at the time this button is clicked. The Insert and Remove buttons are visible only in graph mode and are used to insert and remove data points in the graphical view of the transect. To view the changes made, the Refresh button must be clicked. The database table will not get updated until the Update table menu item is selected from the Graph menu. To undo the changes made to the graphical display of the transect, click on the Transect button or exit the Transect Edit program without updating the table. A point identifying the Primary Frontal Dune (PFD) can be added when viewing the adjusted transect graph. Under the Graph menu, select Landward Toe (PFD), then select the point along the transect where the landward limit of the primary frontal dune is located. To learn about the function of the graphical displays, see section 4.7 below titled **Graphic Controls**.

- Refresh: Reformats Field Station and Elevation columns in numerical order of station value if new data are entered. New station and elevation data can be entered at the bottom of the data entry fields.

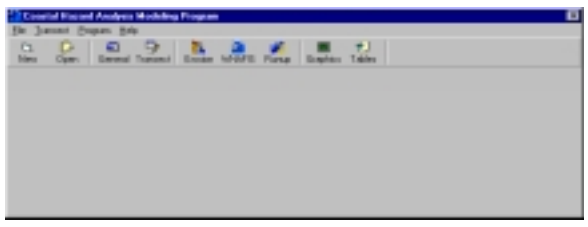
After inputting the transect information as summarized in the Project & Transect Data Entry Procedures flowchart (on the following page), CHAMP allows the user to analyze and model data. The remaining sections of Chapter 4 offer a detailed description of Programs 3 through 6.

Project & Transect Data Entry Procedures

Splash Screen

Click Start

Main Project Window—No Open Project

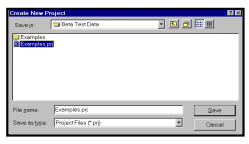


Click Import

① Import Data

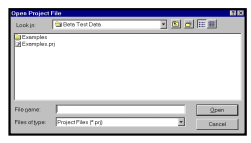
Click New

① New Project

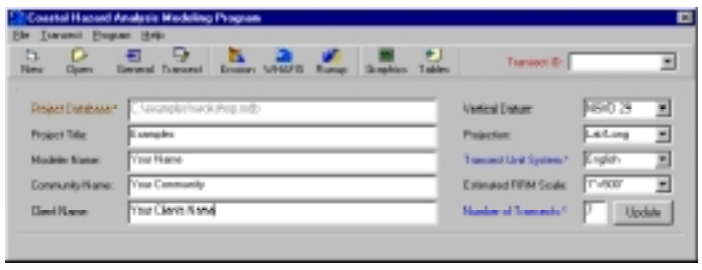


Click Open

① Open Project



② Main Project Window—Open Project

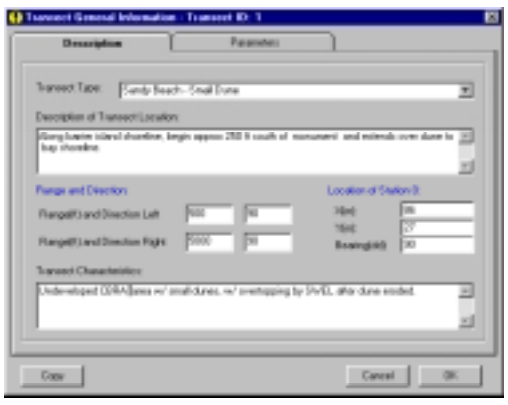


Click Save

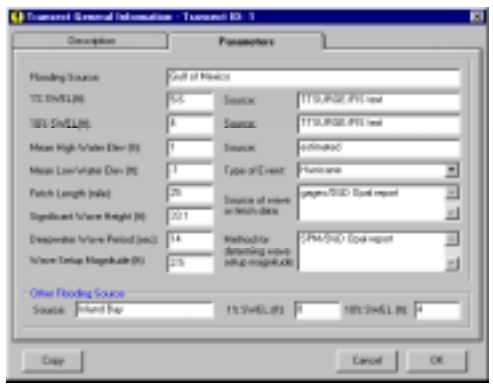
Click Open

Select a transect ID
Click General

③ Transect Description



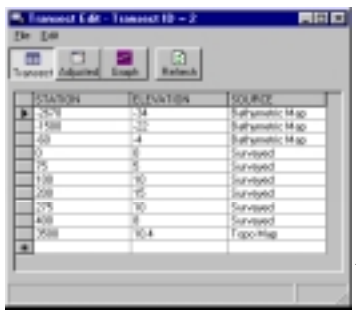
③ Transect Parameters



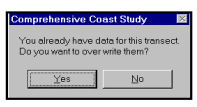
Click Exit

Click Transect

④ Transect Data Table

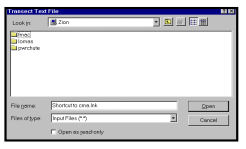


Click Import



Yes for permanent OVERWRITE

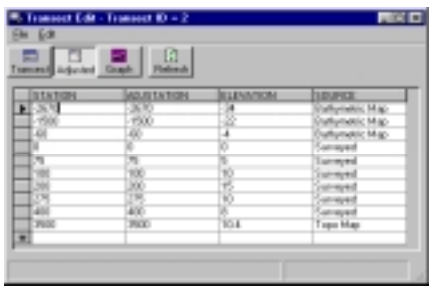
Import Text file
(import .csv file from excel)



Click Open

Click Adjust
(mandatory)

⑤ Adjusted Transect Data



⑥ Close Window, select another transect

OR

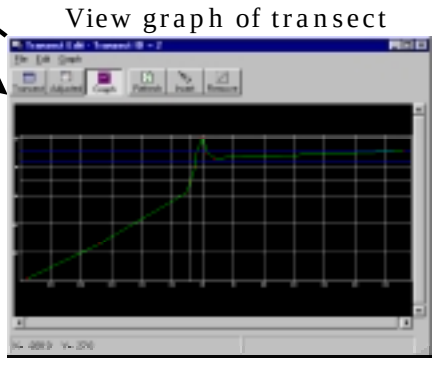
Close Window

⑦ Go to:
Erosion Assessment
WHAFIS
RUNUP

Click Transect

View graph of transect

Click Graph



4.3 Program 3: Erosion Treatment

Wave analysis transects normally undergo FEMA's standard erosion treatment before being used as input to the WHAFIS 3.0 or RUNUP 2.0 models. The G&S should be referenced for more detailed descriptions of the terms and procedures used for performing the erosion treatment. For cases where the existing transect data already represent the eroded profile, or erosion will not be applicable (i.e., hardened shoreline or rocky coast), the user can bypass this program. It is particularly important that the 1% annual chance stillwater elevation and profile data be firmly established before performing the erosion treatment.

CHAMP assists the user in performing the erosion treatment and adjustment through the **Eroded Assessment Program** window, which is accessed by choosing the **EROSION** button on the **Main Menu Button Bar**.

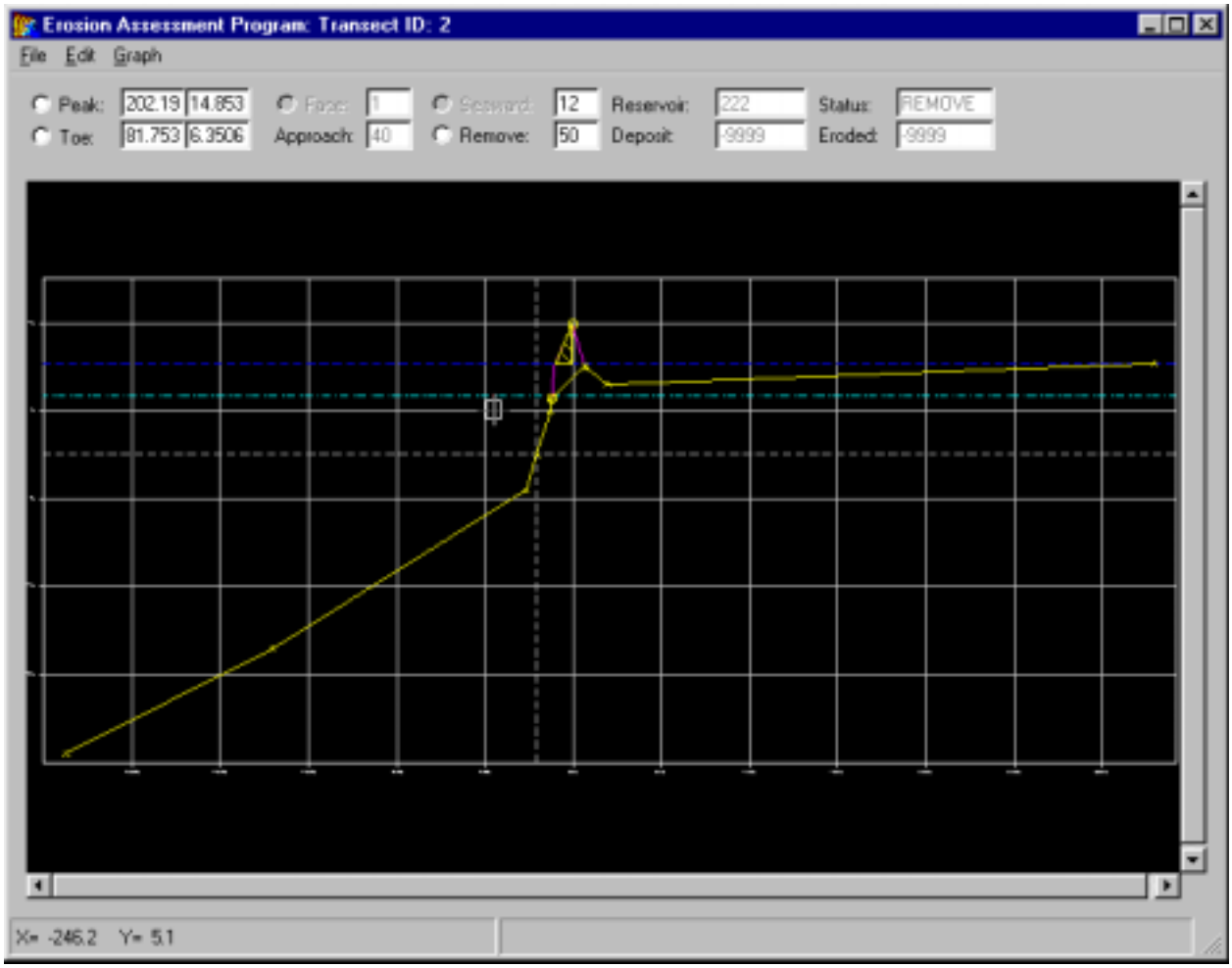
The **Erosion Assessment Program** will display the adjusted transect data on a graph of Elevation versus Distance (station), with increasing stations being landward. Horizontal lines representing the 1% and 10% annual chance stillwater elevations (without wave setup) are also shown. The interactive user controls are accessed through the tool bar at the top of the editor window. These controls include the following functions (left to right):

- Set Peak
- Set Toe
- Set Face Slope
- Set Approach Slope
- Set Seaward Slope
- Set Remove Slope
- Computed Reservoir Area
- Deposit Area
- Erosion Profile Status
- Eroded Area

In addition, the user must enter or confirm default values for one or more of the following parameters, as applicable: Seaward Slope (1/12), Face Slope (1/1), and Approach Slope (1/40) for "Retreat" profiles; or Removal Slope (1/50) for "Removal" profiles. Note: default values are in parentheses; slopes are vertical/horizontal.

To get a closer look at the transect profile segments, use the View item under the Graph menu or right-click on the graphic screen to activate a prompt to the following functions: Zoom Window, Zoom In, Zoom Out, Full Extent, and Pan. See section 4.7; Graphic Controls for a description of the View commands as well as all graphic commands.

Setup under the Graph menu is used to adjust axes scales and intervals. See section 4.7 for a description of the Setup options.



The erosion assessment analysis is performed graphically by selecting points along the profile. The program requires the user to select these points. The following step-by-step instructions outline the procedures for performing a frontal dune erosion treatment within CHAMP.

1. Establishing Dune Reservoir

Selecting the peak of the dune:

Click on the Peak field on the top of the window. Click on the profile where the appropriate peak of the dune is located. The coordinates of the point selected will be shown in the data fields next to the Peak field. The program will draw in the dune reservoir and calculate the area of the reservoir and show this value in the Reservoir field. If the peak needs to be moved or reselected, this can be done by clicking on the Peak field again and selecting the new dune peak location on the transect.

NOTE: The minimum value of the dune reservoir before the dune is considered removed is the FEMA standard value of 540 ft^2 for the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico. The program will also show whether the dune is removed or retreated in the Status field.

The reservoir is calculated as the cross sectional area between the 1% annual chance SWEL (without wave setup), a vertical line drawn through the dune peak, and the transect ground profile for the foreshore dune area (seaward of the dune crest). If this area is less than the critical area of 540 ft^2, the profile adjustment will be for dune removal, and noted as "Remove" in the Status field. If the computed area is greater than or equal to the critical area, the Status field will be adjusted to reflect dune retreat, and noted as "Retreat" in the Status field.

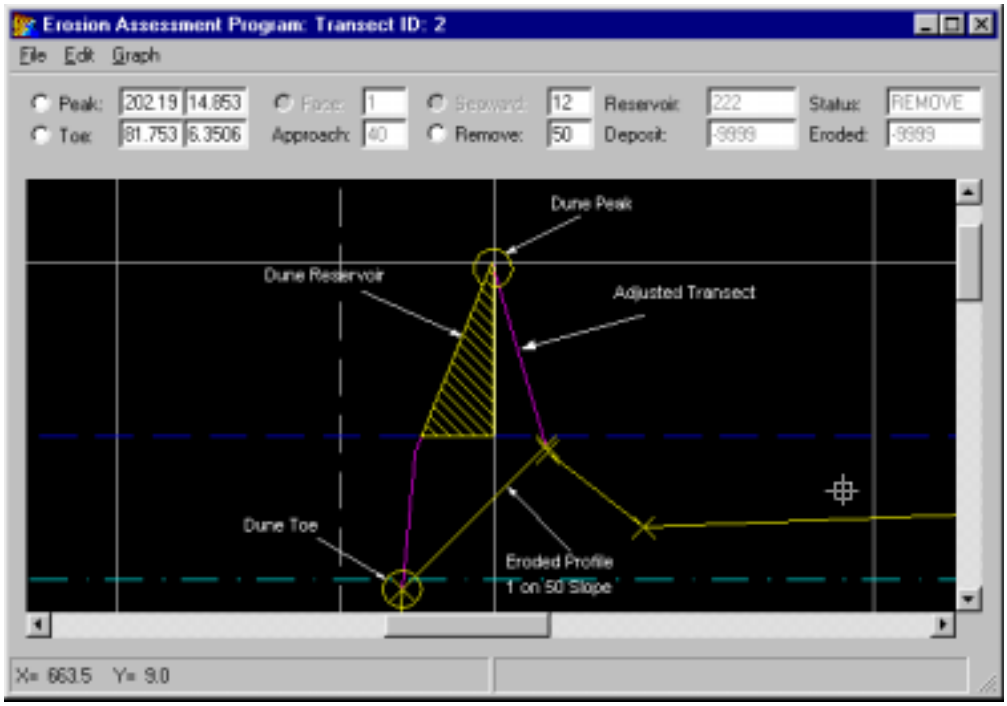
If the 1% annual chance SWEL is above the highest elevation along a profile, the transect will automatically be given a "Remove" status; hence, the method for dune removal should be followed and selecting the peak for dune reservoir calculation can be skipped. A problem occurs when the dune is below the 1% annual chance SWEL, but the profile rises above the 1% annual chance SWEL after some back bay type area. In this case, the program will not allow the selection of the dune peak and will not allow an erosion profile to be calculated. The user needs to either remove the points above the 1% annual chance SWEL past the dune peak or adjust the transect data points as necessary in the **Transect Edit Program** and skip the **Erosion Program**.

2. Method for Dune Removal

If the dune is eroded, follow the steps below:

Click the Toe field and select the appropriate place along the profile that best represents the location of the dune toe. The toe of the dune can also be approximated by the intersection of the 10% SWEL with the seaward side of the ground profile. The dune toe can be changed by clicking on the Toe field again and reselecting the point on the profile.

The program defaults to using the standard slope for an eroded profile as 1 on 50. If an alternate slope is desired, the value can be changed in the Remove field. Click on the Remove field button. The program will draw the eroded profile and calculate the eroded area as shown in the Eroded field.

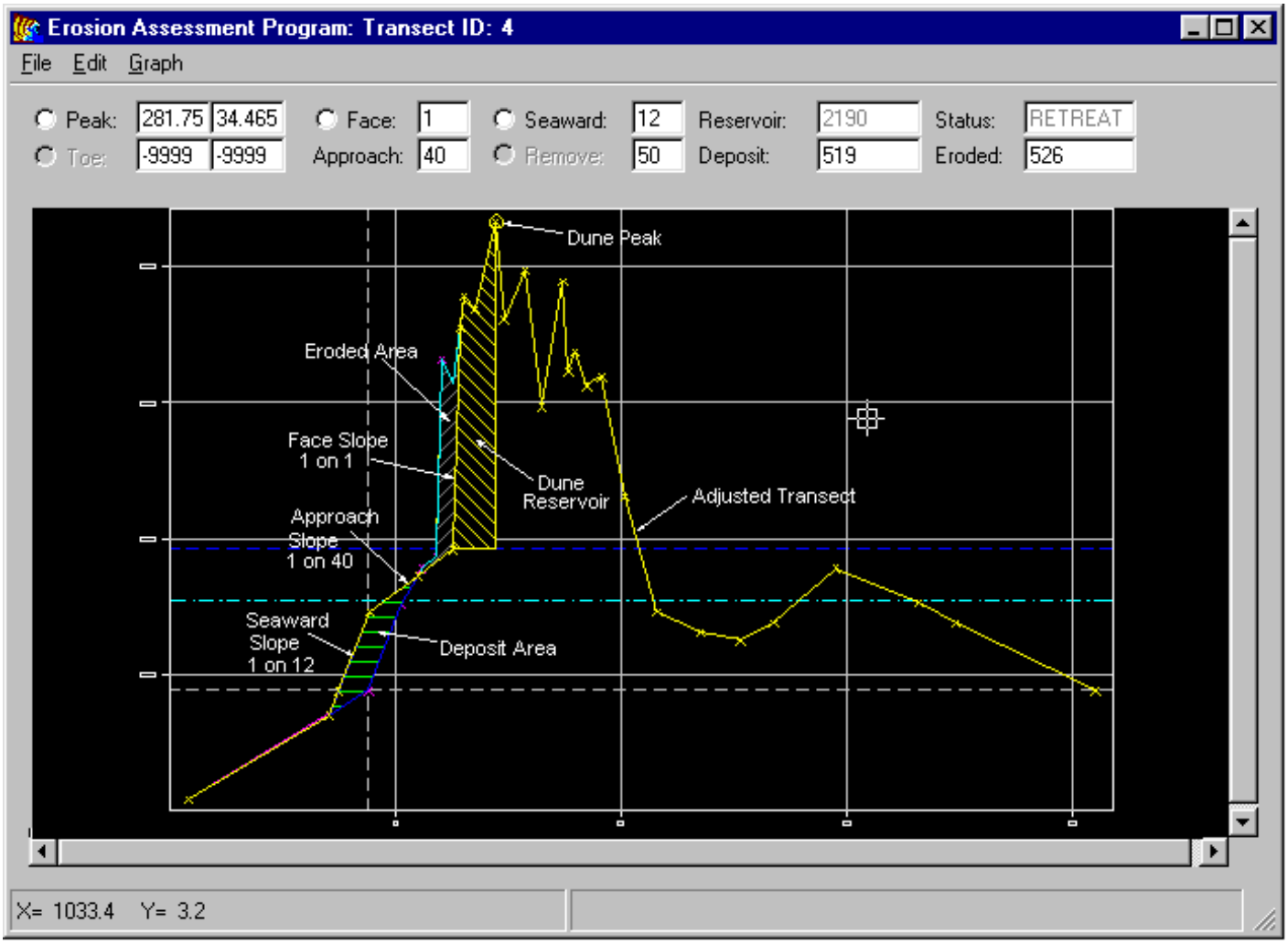


3. Method for Dune Retreat

If the dune is retreating, follow the steps below:

Define the eroded area of the dune. First click the Face field and select the position for the 1-on-1 eroded dune face that is a best initial guess where the eroded area may be equal to 540 ft^2. Check the Eroded field to see what the eroded area is. If the eroded area is not equal to or close to 540 ft^2, then re-select the position of the eroded dune face and check the Eroded field again. Repeat this until the eroded area is equal to or close to the 540 ft^2.

Determine the seaward slope and position that best gives a deposition area that closely matches the eroded area (check the Deposit field). Select the Seaward field and then select the position for the 1-on-12 slope by clicking on the graph. This will place a 1-on-12 slope line on the screen. The seaward slope will be placed at the position of the mouse cursor, and the program will calculate the deposition area as shown in the figure below.



Check the Deposit field to see if it matches the Eroded field. If they match or are close, the erosion treatment is complete. If they are not close, the selection of the seaward slope can be repeated until the deposition area matches the eroded area.

IMPORTANT: When the user is satisfied with the eroded profile slopes and the eroded and deposited areas, the erosion profile needs to be saved in the database by selecting the Save Model menu item under the File menu. CHAMP will then create a data table for the eroded profile, which will be used as the WHAFIS 3.0 and RUNUP 2.0 input files in Programs 3 and 4.

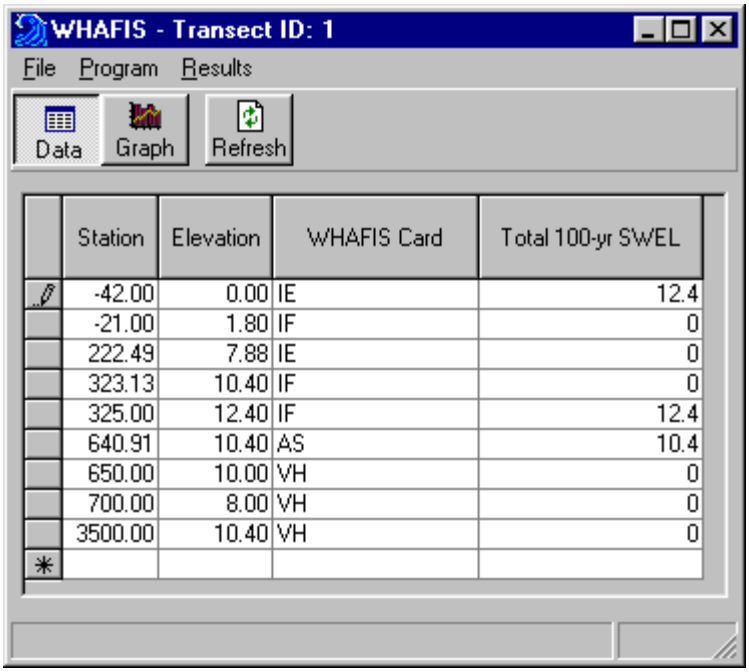
To clear out the erosion profile in the database, click the Clear Model menu item under the File menu. This can be used when an erosion analysis was performed previously and the user wants to re-do the erosion analysis or if the user wants to run WHAFIS or RUNUP with the non-eroded adjusted transect data.

WARNING: Once the clear model command is selected the erosion table in the database is cleared and can not be undone or brought back. The user needs to perform the erosion analysis again.

Exit from the **Erosion Graphic Editor** window by clicking on the window closure X in the upper right corner. As a precaution the program will ask if the user wishes to save any changes made to the erosion profile. Click Yes if you wish to save changes or No if you wish to disregard any changes made.

4.4 Program 4: Wave Height Analysis

This program is used to specify the input parameters for and run the Wave Height Analysis for Flood Insurance Studies (WHAFIS 3.0) program on the selected transect. Consult the G&S for more detailed information on the WHAFIS program. To begin the wave height analysis, click on the WHAFIS button on the **Main Menu Button Bar**. The **WHAFIS Program** window shown below will open.



	Station	Elevation	WHAFIS Card	Total 100-yr SWEL
	-42.00	0.00	IE	12.4
	-21.00	1.80	IF	0
	222.49	7.88	IE	0
	323.13	10.40	IF	0
	325.00	12.40	IF	12.4
	640.91	10.40	AS	10.4
	650.00	10.00	VH	0
	700.00	8.00	VH	0
	3500.00	10.40	VH	0
*				

1. Transferring adjusted data to WHAFIS Program

Click the Populate Data item under the File menu to extract data from either the eroded transect or the non-eroded transect data entered in the **Transect Data Entry and Editing Program**. The station and elevation columns in this window will be filled in with the transect data. WHAFIS uses points only from the zero elevation shoreward. These will be the only stations used for WHAFIS input cards. WHAFIS will also populate only with data points that are equal to or below the total stillwater level (100-year plus wave setup). Segments above the total stillwater level are automatically considered X zones and are not needed for the WHAFIS program. The WHAFIS Program is limited to 200 data points per transect. Therefore, some data points may need to be removed before running the program.

2. WHAFIS card selection

The WHAFIS Card column will be defaulted to the IF card except for the first card. The first input card to WHAFIS must always be an IE card. By clicking on a field for each station, a drop-down menu will appear with all the card options for WHAFIS. Click on the appropriate card for each station. By selecting or double-clicking on a

card field that requires additional input (e.g., VE, VH cards), an input window will pop up for that card. Fill in all the fields with station-specific information. When editing the VH card, click on the MG button to enter additional data.

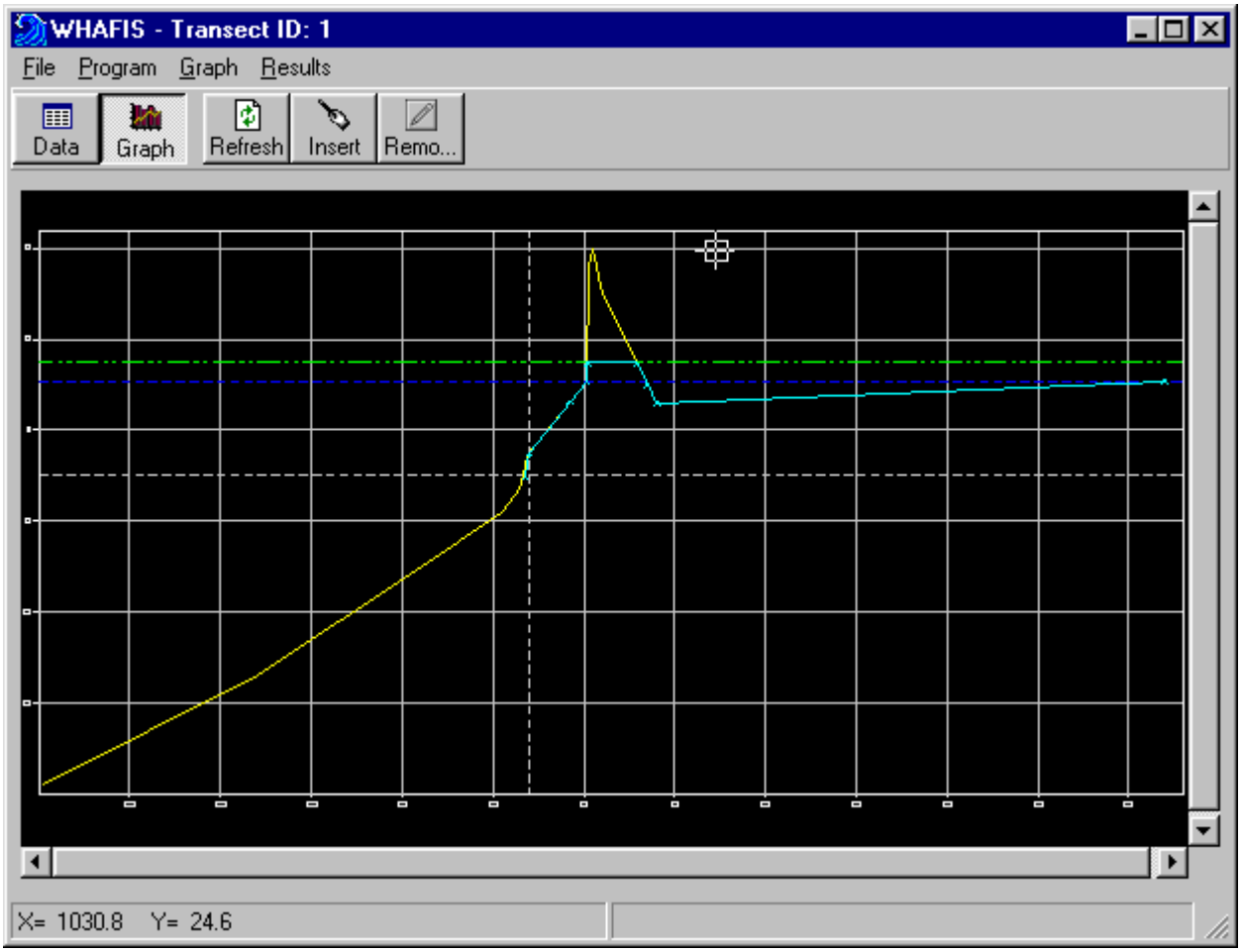
3. Stillwater elevation for 100-year

The Total 100-yr SWEL field for the first station will be filled in with the 100-year SWEL plus the setup entered in the **Transect Description/Parameter Entry Program**. If there is a change in the 100-year SWEL as the transect proceeds inland, enter the new 100-year SWEL in this column at the appropriate station. The SWEL change is possible where the transect crosses over a barrier island and extends across an inland bay or other secondary flood source. If the open coast barrier island or mainland ground elevations rise above the 100-year SWEL plus setup, the transect will terminate. If the transect extends into a secondary flood source or further inland flood areas, then the setup should be taken out of the total 100-year SWEL value.

Further refinements of the SWEL changes and new station locations can be made via the graphical display (See Step No. 4). Anytime the ground elevation rises above the 100-year SWEL and then drops below the 100-year SWEL along the transect path, a station will need to be inserted manually where the ground elevation crosses the 100-year SWEL. Thus, two points should be added for a profile that rises above and then falls below the 100-yr SWEL. WHAFIS will not run without this consideration. Refer to the G&S for further guidance on WHAFIS modeling for SWEL changes. See below on how to insert a transect point.

4. Graph display of WHAFIS input and eroded or adjusted transect data

Click on the Graph button of the **WHAFIS Program** window to plot the transect as shown in the window below. Additional data points can be inserted from this window.



The plot will show all of the original adjusted (blue)or eroded (yellow) profile ground elevation transect points and line. The transect points and line being used for the WHAFIS input will be represented in magenta. The total 100-year SWEL (with wave setup if applicable) will also be plotted as a yellow dashed straight line across the graph. To get a closer look at the profile, as described previously, click on View or right-click the mouse on the graphic screen (see section 4.7).

To add a transect point, click on the Insert button and then click on the point along the profile where the additional points are needed. Click on the Refresh button to update the graphic view to see the results of the inserted points**. The station and elevation of the new points will not be inserted into the WHAFIS data input table until the table is updated by clicking on the Update table menu item under the Graph menu**. Click on the Data button or return to the WHAFIS data input table to complete the fetch and WHAFIS card fields for the inserted point. If the inserted points are not wanted the results can be undone before the table is updated by

switching to the table view and then back to the graph; the inserted points will be removed. If a data point needs to be removed from the WHAFIS input, select the points to be removed by clicking on them and then clicking the Remove button. Again, the Refresh button needs to be clicked to see the results of the removed points, and the table will not be updated until the Update table menu item under the Graph menu is selected.

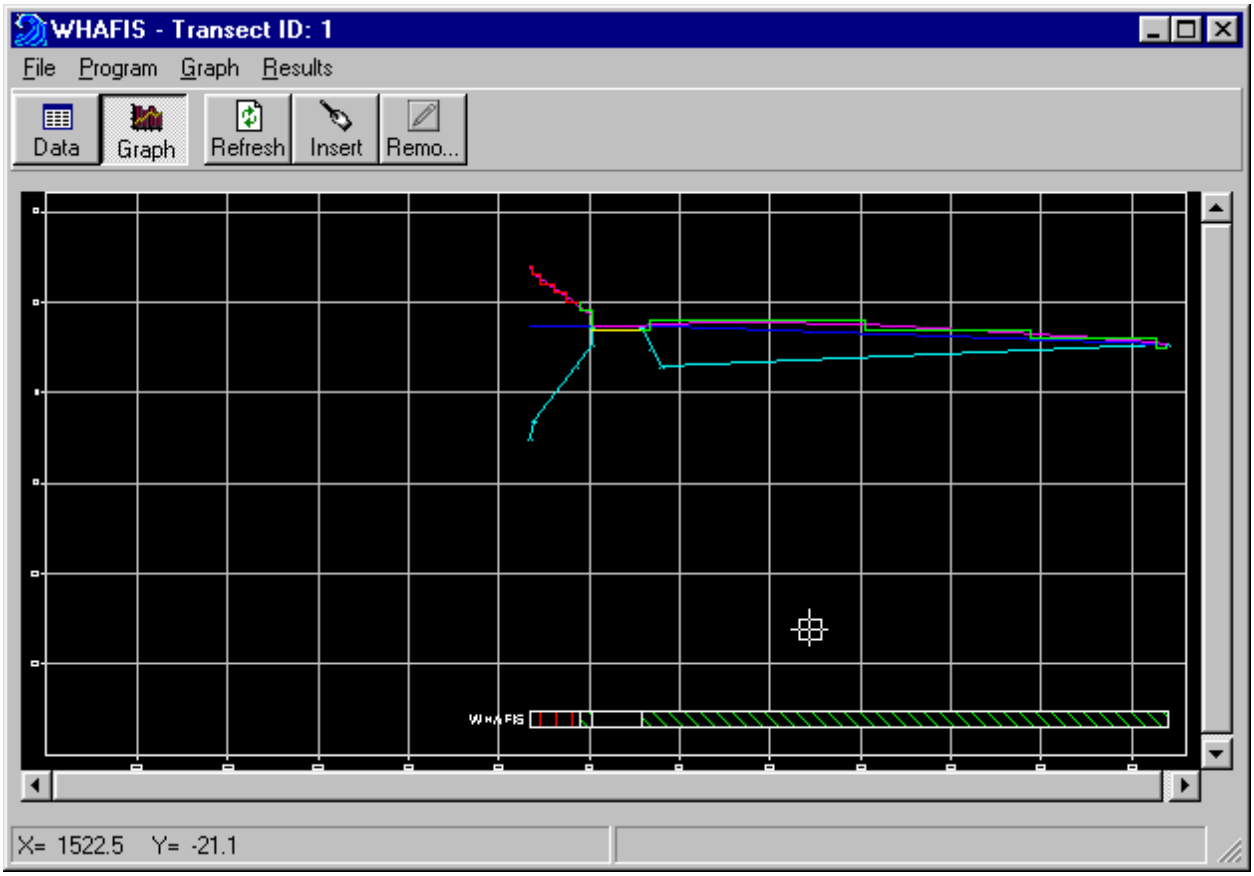
Warning: If the Table button is clicked to return to the table view without first updating the table with the inserted or removed data points, the changed results of the inserted or removed points will be lost.

5. WHAFIS computational application

Click on the Run WHAFIS item under the Program menu **WHAFIS Program** window to execute the WHAFIS program. A DOS-run window will open; it will appear either minimized or opened on screen. When "Stop – Program terminated" appears in the DOS window, the WHAFIS program is complete and the DOS window can be closed. If the WHAFIS program ran successfully, a "WHAFIS RUN finished" box will appear; click on the OK button. If WHAFIS did not run correctly, an error message will appear and the input file should be checked for errors.

6. Graphical display of WHAFIS output data

Click on the Graph Results item under the Graph menu while in the graphic view of the **WHAFIS Program** window to see a graphical plot of the WHAFIS results. This will bring up a plot of the profile showing input profile, stillwater elevations, and the wave envelope.



A hatched color-coded bar at the bottom of the plot represents the different zones:

- VE Zone—Red
- AE Zone—Green
- X Zone—Yellow

Other lines within the graphical display correspond to the following elevations:

- Total 100-year SWEL (100-year SWEL plus wave setup)—Dark blue line
- Wave Crest Elevation—Purple line
- Zone Elevation Designations—Stair-stepped line, the color of which corresponds to the zone bar colors at the bottom of the plot.

7. Return to main data display

Click on the Data button to return to the WHAFIS input table.

If the WHAFIS graphic is viewed again the graph will go back to showing the WHAFIS input profile. The Graph Results menu item needs to be selected again to view the results to the WHAFIS model.

8. WHAFIS data viewing

The Results menu of the **WHAFIS Program** window includes the WHAFIS input and output results. The input and output text files, and WHAFIS output files (in six parts) can be viewed and printed in table format. The different output parts are shown below.

Part 1 is the input information.

Data Viewer: C:\Program Files\CHAMP\samples\Examples.mdb

File

WHAFIS CARD	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	FIELD 10	FIELD 11
IE	.000	.000	24.000	6.600	12.400	44.800	12.700	.000	.067	.000	
IF	75.000	5.000	.000	12.400	.000	.000	.000	.000	.032	.000	
IF	303.00(	9.560	6.600	12.400	.000	.000	.000	.000	.009	.000	
VH	400.00(	8.000	2.000	1.000	.000	1.000	.000	12.303	.000	.000	
MG	SPAT	.100	.000	.850	327.00(	.000	.000	.000	.000	.000	
VH	2303.00	9.500	2.000	1.000	.000	1.000	6.600	10.400	.001	.000	
MG	SPAT	.100	.000	.850	327.00(	.000	.000	.000	.000	.000	
VH	3500.00	10.400	2.000	1.000	.000	1.000	.000	10.400	.001	.000	
MG	SPAT	.100	.000	.850	327.00(	.000	.000	.000	.000	.000	

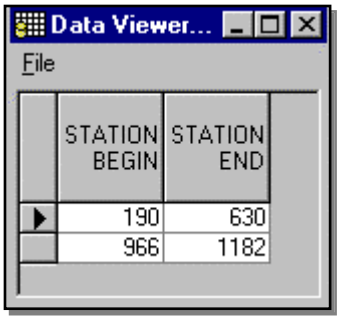
Part 2 shows the controlling wave heights, spectral peak wave period, and wave crest elevations for the data entry points and all WHAFIS interpolated values.

Data Viewer: C:\Program Files\CHAMP\...

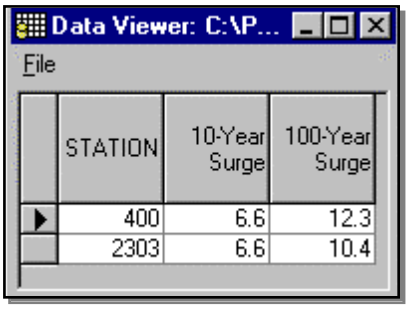
File

WHAFIS CARD	STATION	WAVE HEIGHT	WAVE PERIOD	WAVE CREST ELEVATION
IE	0	9.45	12.7	19.01
IF	75	5.69	12.7	16.38
	177.6	4.13	12.7	15.29
	280.2	2.55	12.7	14.19
IF	303	2.2	12.7	13.94
VH	400	2.29	12.7	13.91
	550	2.2	12.7	13.69
	710	2.1	12.7	13.46
	1030	1.9	12.7	13.01
	1350	1.71	12.7	12.55
	1670	1.49	12.7	12.08
	1990	1.14	12.7	11.51
	2150	0.91	12.7	11.19
VH	2303	0.7	12.7	10.89
	2453	0.61	12.7	10.83
	2613	0.52	12.7	10.76
	2933	0.33	12.7	10.63
	3253	0.14	12.7	10.5
VH	3500	0.01	12.7	10.41

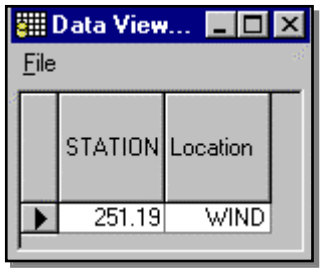
Part 3 shows the location of areas above the 100-year surge. If no areas are above the 100-year surge, no table will be displayed.



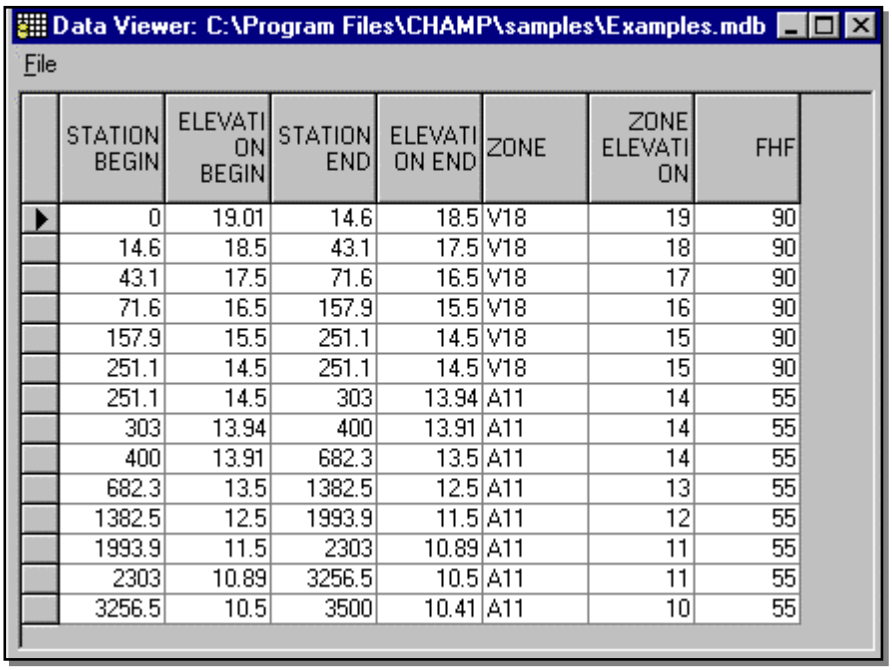
Part 4 shows the location (if any) of surge changes.



Part 5 shows the locations (if any) of the V Zone to A Zone gutter (windward) and the A Zone to V Zone gutter (leeward).



Part 6 shows the station and location of the base flood elevation and respective A Zone and V Zone designation for mapping purposes. Refer to the G&S for additional details on output interpretation and mapping of coastal areas.



	STATION BEGIN	ELEVATION BEGIN	STATION END	ELEVATION END	ZONE	ZONE ELEVATION	FHF
▶	0	19.01	14.6	18.5	V18	19	90
	14.6	18.5	43.1	17.5	V18	18	90
	43.1	17.5	71.6	16.5	V18	17	90
	71.6	16.5	157.9	15.5	V18	16	90
	157.9	15.5	251.1	14.5	V18	15	90
	251.1	14.5	251.1	14.5	V18	15	90
	251.1	14.5	303	13.94	A11	14	55
	303	13.94	400	13.91	A11	14	55
	400	13.91	682.3	13.5	A11	14	55
	682.3	13.5	1382.5	12.5	A11	13	55
	1382.5	12.5	1993.9	11.5	A11	12	55
	1993.9	11.5	2303	10.89	A11	11	55
	2303	10.89	3256.5	10.5	A11	11	55
	3256.5	10.5	3500	10.41	A11	10	55

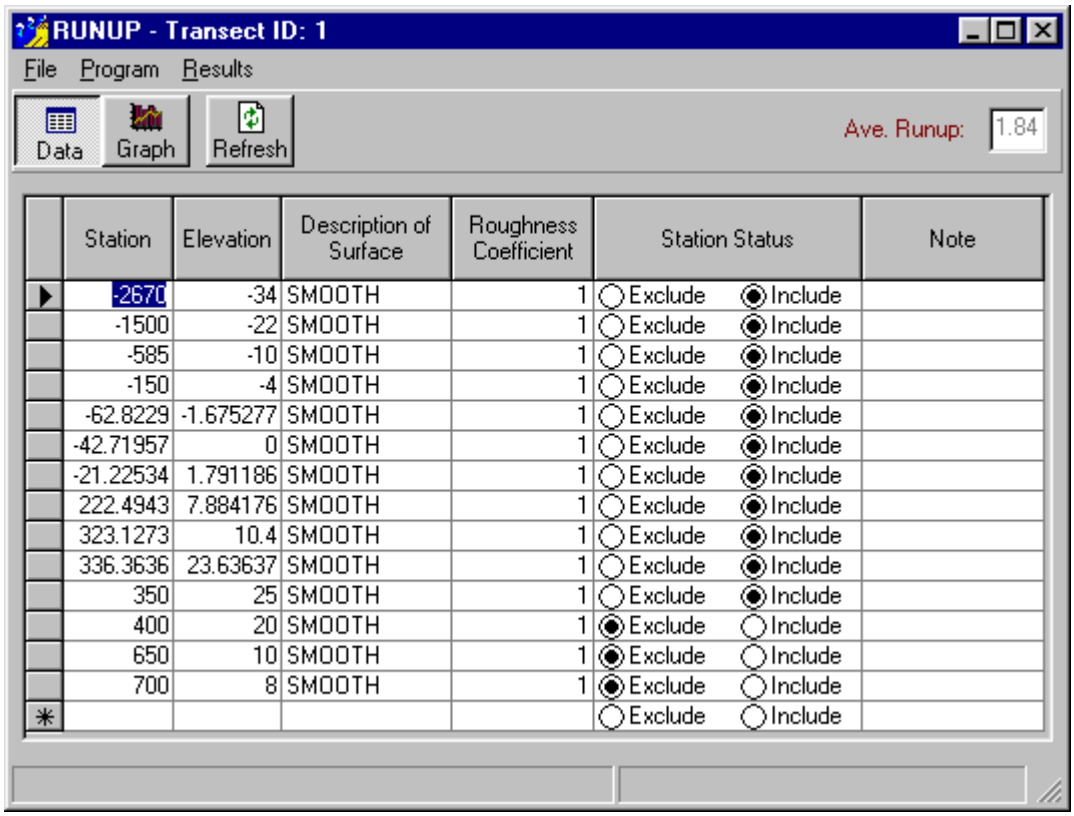
9. Exiting WHAFIS Program

When finished with the **Wave Height Analysis Program**, close the WHAFIS windows by clicking on the [X] in the upper right corners on each window. Then, continue with Program 5, or proceed to Program 6.

4.5 Program 5: Wave Runup Analysis

This program is used to run the FEMA RUNUP (Version 2.0) model on the selected transect. The FEMA RUNUP model applies only to runup on sloped beaches. The U.S. Army Corps of Engineers Shore Protection Manual (1984) should be consulted for runup on vertical walls and armored rocky revetments. The G&S should be consulted for a detailed description on applying runup and running the FEMA RUNUP model.

To begin the RUNUP program, click on the RUNUP button on the **Main Menu Button Bar**. The window shown below will open:



	Station	Elevation	Description of Surface	Roughness Coefficient	Station Status	Note
▶	-2670	-34	SMOOTH	1	○ Exclude ◉ Include	
	-1500	-22	SMOOTH	1	○ Exclude ◉ Include	
	-585	-10	SMOOTH	1	○ Exclude ◉ Include	
	-150	-4	SMOOTH	1	○ Exclude ◉ Include	
	-62.8229	-1.675277	SMOOTH	1	○ Exclude ◉ Include	
	-42.71957	0	SMOOTH	1	○ Exclude ◉ Include	
	-21.22534	1.791186	SMOOTH	1	○ Exclude ◉ Include	
	222.4943	7.884176	SMOOTH	1	○ Exclude ◉ Include	
	323.1273	10.4	SMOOTH	1	○ Exclude ◉ Include	
	336.3636	23.63637	SMOOTH	1	○ Exclude ◉ Include	
	350	25	SMOOTH	1	○ Exclude ◉ Include	
	400	20	SMOOTH	1	◉ Exclude ○ Include	
	650	10	SMOOTH	1	◉ Exclude ○ Include	
	700	8	SMOOTH	1	◉ Exclude ○ Include	
✳					○ Exclude ○ Include	

1. Transferring adjusted data to RUNUP program

Click on the Populate item under the File menu to fill in the **Runup Program** window with data from the transect. The Station and Elevation columns will be filled in with all of the transect eroded profile data points (both offshore and onshore).

2. Selecting roughness coefficients

The Description of Surface column will be defaulted to smooth. By clicking on each field for each station, a drop-down menu appears where a selection of the type of runup surface can be made. The Roughness Coefficient column will be defaulted to 1 for smooth runup surfaces and will adjust automatically based on the Description of Surface column input. Click in the field of each station to change the coefficient.

3. Transect data point selection for wave runup analysis

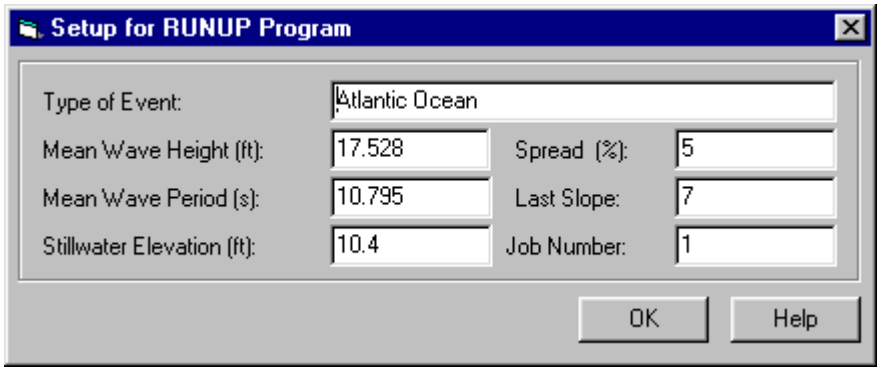
The Station Status column is for indicating which stations will be used for input into the RUNUP model. The RUNUP Program is limited to 20 data points per transect. The selected button indicates that either the station is excluded and will not be used as input, or the station will be included for input. The default is to exclude the stations. Stations or data points can be included or excluded by clicking on the appropriate button under Station Status. All data points landward of the highest point on the runup slope should be excluded.

4. Annotations for selected data points

The Note column is for entering any comment necessary to describe the runup at a particular station. Just click on the appropriate row and enter the comment.

5. Setup for RUNUP program

Selecting the Setup for RUNUP program item under the Program menu opens the table shown below.



a. Wave Information

The Type of Event, Mean Wave Height, Mean Wave Period, and Stillwater Elevation data fields will be filled in automatically according to the data entered in the **Detailed Transect Information** window on the **Parameter** tab in the **Transect Data Entry and Editing Program**. Adjustments from "Significant" to "Mean" wave height and wave period conditions are made automatically. These data can be changed here if necessary.

b. Defining range for wave height and wave period characteristics

The Spread data field will be defaulted to 5%. This field is for specifying the range of wave heights and periods for RUNUP to use. RUNUP will use the 5% higher input wave height, the unchanged wave height, and the 5% lower wave height, in combination with the 5% higher and lower wave period. An additional spread value of 10% can be specified if the 5% range is not deemed significant.

c. Last slope for extended hypothetical profile

The Last Slope field is for entering the slope immediately landward of the last profile point. This field defaults to 50 and should be changed to represent the current profile.

d. Tracking wave runup projects

The Job Number field is for identifying the RUNUP run and will be used in the titles of the RUNUP input and output. It can be numeric or alphabetic, and its default is 1.

Click on the OK button to continue with the RUNUP analysis.

6. Graph display of RUNUP input transect data

Click on the Graph button of the **RUNUP Program** window to plot the transect. The runup profile and results will be plotted in red. Additional data points can be inserted or removed from the graph window in the same way as described previously in section 4.4 Wave Height Analysis. The Refresh button needs to be clicked to see the results of the inserted or removed points, and the table will not be updated until the Update table menu item under the Graph menu is selected.

Warning: If the Table button is clicked to return to the table view without first updating the table with the inserted or removed data points, the changed results of the inserted or removed points will be lost.

7. RUNUP computational application

Once all input for the RUNUP model is complete, click on the Run RUNUP item on the Program menu to run the model. A DOS-run window will open. When "Stop – Program terminated" appears in the DOS window, the RUNUP program is complete and the DOS window can be closed. If the RUNUP program ran successfully, a "RUNUP RUN finished" box will appear; click on the OK button. If RUNUP did not run correctly, an error message will appear.

8. Display of RUNUP results

The average runup depth computed from the model results will be displayed in the Ave. Runup field in the upper right corner of the **Runup Program** window. To view the input or output text files, click on the Results drop-down menu and select the appropriate choice. A table of the RUNUP results of all wave heights and periods run can be seen by clicking on the Results menu and selecting Output Data Table. A table similar to the one shown below will be displayed.

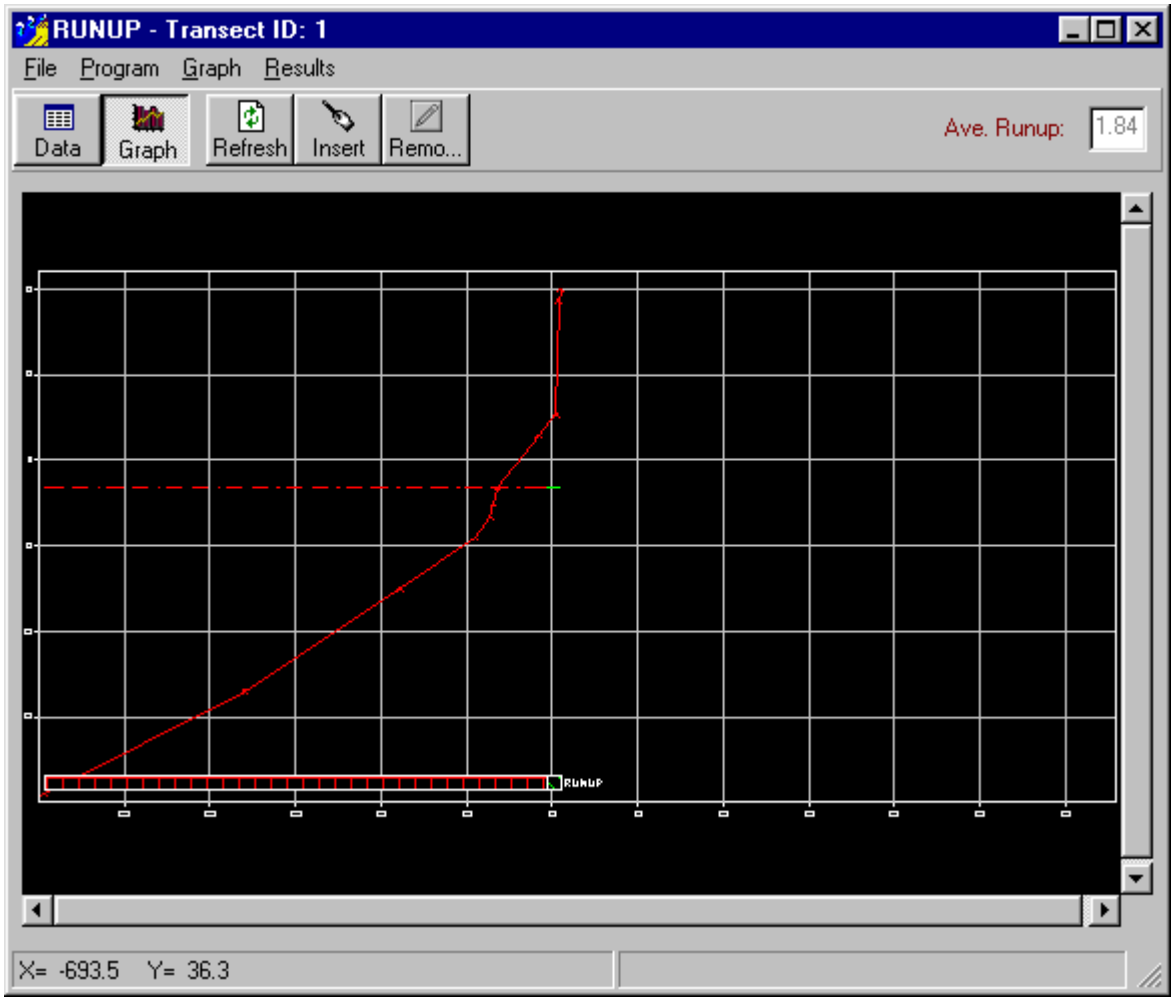
Data Viewer: C:\examples\wrokshop.mdb

File

	WATER LEVEL ABOVE DATUM	DEEP WATER WAVE HEIGHT	WAVE PERIOD	BREAKING SLOPE NUMBER	RUNUP SLOPE NUMBER	RUNUP ABOVE WATER LEVEL	BREAKER DEPTH
▶	10.4	16.7	10.3	2	9	1.67	26.6
	10.4	16.7	10.8	2	9	1.84	26.97
	10.4	16.7	11.3	2	9	1.84	27.34
	10.4	17.5	10.3	2	9	1.75	27.69
	10.4	17.5	10.8	2	9	1.92	28.07
	10.4	17.5	11.3	2	9	1.92	28.45
	10.4	18.4	10.3	2	9	1.84	28.91
	10.4	18.4	10.8	2	9	1.84	29.3
	10.4	18.4	11.3	2	9	2.02	29.69

9. Graphical display of RUNUP results

To view a graph of the RUNUP profile and results, click on the Graph Results item under the Graph menu while in the graph view. A window similar to the one shown below will be displayed.



This plot shows the profile used in the runup analysis in red and the computed runup elevation (average computed runup depth plus SWEL) as a red dashed line. Click on the Data button to return to the RUNUP input window

> If an area of shallow flooding exists beyond the crest of the dune and the runup overtops the crest of the dune, an area of shallow flooding should be identified by designating the area an AO Zone of 1, 2, or 3 foot depth. Consult the G&S for a more detailed explanation on the application of AO Zones.

10. Return to main data display

Click on the Data button to return to the RUNUP input table.

If the RUNUP graphic is viewed again the graph will go back to showing the RUNUP input profile. The Graph Results menu item needs to be selected again to view the results to the RUNUP model.

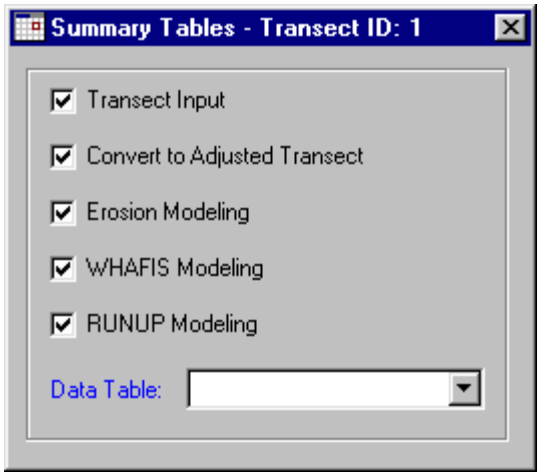
11. Exiting RUNUP Program

When the wave runup analysis is complete, close the RUNUP windows by clicking on the X in the upper right corners of each window.

4.6 Program 6: Summary Tables and Graphics for Mapping

1. Summary Table

This program is used to view all of the results from the analysis on the selected transect. Click on the **Summary Table** button on the **Main Menu Button Bar** to open the window as shown below.



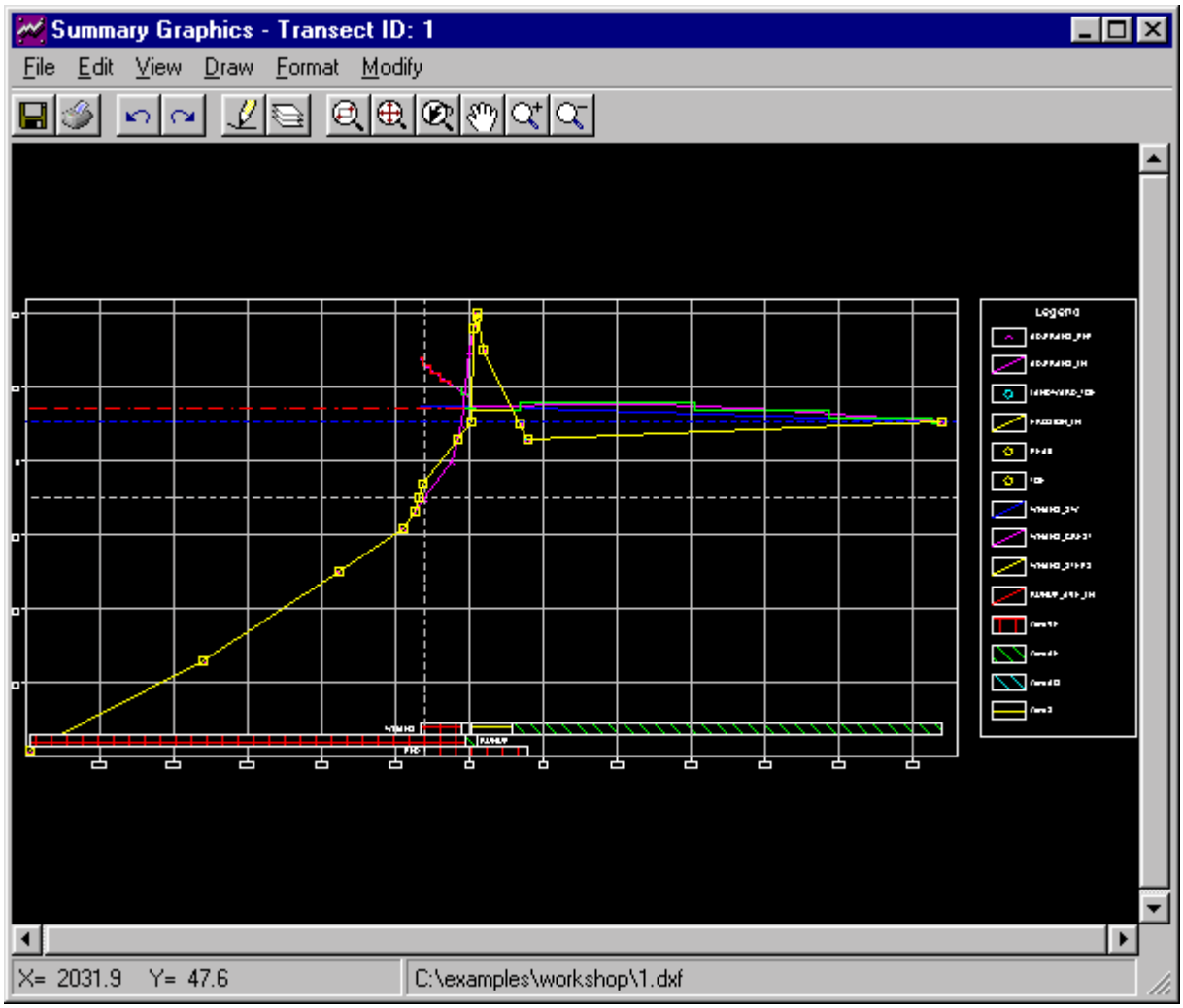
Each phase or program of CHAMP is listed. When a program has been completed, a check mark will be shown next to that program. Should your modeling effort be interrupted for some reason, this feature can be used to keep track of all completed analyses and track the remaining analyses to be completed for each transect.

To view the input and output and all of the results in tabular and text format, click on the Data Table drop-down menu. Click on a table to view it. The following tables are available for viewing:

- Transect
- Adjusted Transect
- Eroded Transect
- WHAFIS
- WHAFIS Parts 1, 2, 3, 4, 5, and 6
- STILLWATER
- WHAFIS Input File
- WHAFIS Output File
- RUNUP
- RUNUP Output
- RUNUP Input File
- RUNUP Output File
- RUNUP Zone

2. Summary Graphics

To view all of the analyses results in graphical format, click on the **Graphics** button on the **Main Menu Button Bar**. The window below will open.



This plot displays all of the results from each program within CHAMP. Each feature can be turned off or on by selecting the Layers item under the Format menu. The graphic can be printed by clicking on the Print menu item under the File menu.

Two options available in the summary graphic important to displaying the results are drawing the PFD Limits and the Legend. Both features can be drawn by selecting the commands from the Draw menu.

By selecting the draw PFD Limits item a horizontal zone bar is draw representing the minimum landward extent of the V-Zone. The PFD has to be identified in the **Edit Transect** module before the PFD limit can be drawn.

Selecting the Legend item in the Draw menu draws the legend on the right side of the grid. The features in the legend will match the features that are turned on in the layers. If layers are turned on or off or colors and line types are changed, the legend needs to be redrawn so that the changes are represented. Selecting the Legend menu item again redraws the legend. The legend can be moved as one piece anywhere desired by using the Move item under the Modify menu.

From the **Summary** program, the results can be evaluated, and if one of the analysis programs needs to be revised or re-run, it can be accomplished by selecting the appropriate program and repeating the steps described above.

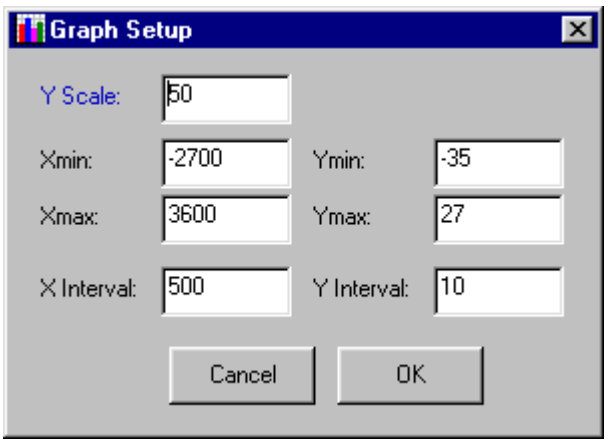
When satisfied with the final results for a transect, the process is repeated for the next transect until the total project is complete.

4.7 Graphic Controls

The graphics are CADD like in function, and many of the commands work in the same way. The graphics for CHAMP are stored in one file for each transect with a DXF extension. Each time a graphic is displayed and results are generated, the information is saved in the one DXF file for that transect. Four options available to all graphic displays are Setup, View, Layers, and Print.

1. Setup

Under the Graph menu, click the Setup item to bring up the following window. On the **Summary Graphic**, Setup is located under the View menu.



This window is used to set the scale and grid for the graphical display. The Y Scale field is used to stretch or shrink the vertical Y axis. The Xmax and Xmin fields set the maximum and minimum stations of the grid. The Ymax and Ymin fields set the maximum and minimum elevations of the grid. The X Interval and Y interval fields set the intervals that the grid lines are displayed.

2. View

To access the View menu either right click or select the View item under the Graph menu. On the **Summary Graphic,** the View menu has more options than other graphs. There are five zoom commands available.

Zoom Window: This option lets the user draw a box around an area to be zoomed in upon.

Zoom In: Zooms one interval closer to center.

Zoom Out: Zooms out one interval further from center.

Full Extent: Fits all within screen window.

Pan: Lets the user drag the screen to re-center the view. Panning can also be accomplished by using the horizontal and vertical slide bars.

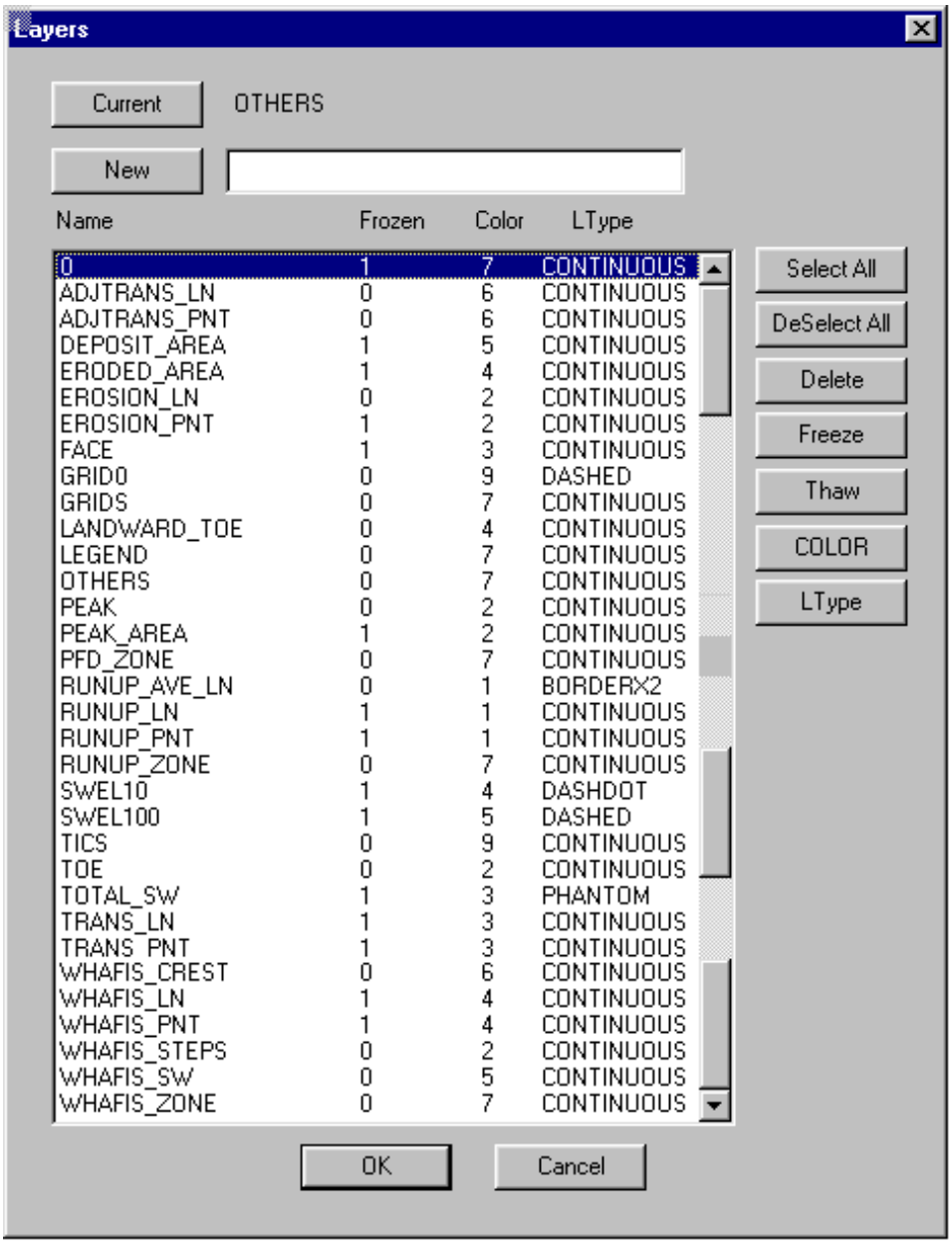
3. Layers

Layers are used to turn on or off different features to be displayed on the graph. Line types and colors of features can also be changed here. The names of the layers correspond to a particular feature; for instance, SWEL100 corresponds to the 100-year stillwater elevation line. The Layers window is accessed by clicking the Layers item under the Graph menu. In the **Summary Graphic**, Layers is located under the Format menu.

To turn a feature off, select the feature and click the Freeze button. The feature must not be the current layer; otherwise, the layer will not Freeze. To change the current layer, select a layer and click the Current button. To turn a feature on, select the feature and click the Thaw button. To change the color of a feature, click the COLOR button and a window will be displayed with the color options. To change the line type, click the Ltype button and a list of available line types will be displayed.

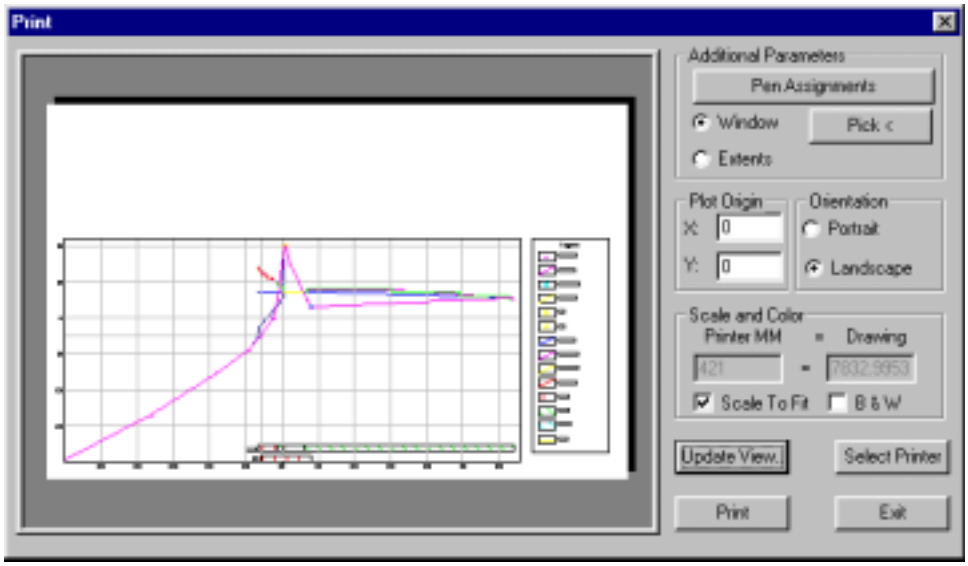
Below is an example of what the layer window looks like. All of the possible layers that can be created are also listed here.

Note: The graphics have to be created first before the layers are created. Going through each program and viewing the graphs or graph results creates the layers. Example: The PEAK layer will not be created until the peak is selected in the Erosion program and the ERODED_LN layer will not be created until the erosion analysis is completed.



4. Print

The Print command can be found under the File menu for all graphs. Once selected, a window, as shown below, will appear.



From here, the printing options can be set. For the best print follow, the steps below:

a. Select the print area by clicking on the Pick button and then drawing a box around the area to be printed.

b. Select Scale to Fit.

c. Select the Select Printer button to setup the printer. In the print window, select properties, where the user can change the paper size and orientation. The Orientation option on the Print window is not operational for Version 1.0 of CHAMP. For best results, it is suggested that the orientation be landscape and the paper size "11 X 17" if available.

d. Select the Update View button to update the print preview with the new settings to make sure the plot looks as desired.

e. Select the Print button to send the plot to the printer.

4. Summary Graphic Options

There are more drawing and editing options available in the Summary Graphic program than for graphics associated with the other programs. These options include:

- Draw menu: There are several items available under the draw menu to add lines and text to the graphic. One can also draw a leader line, which is an arrow pointer. The options to draw the PFD Limits and Legend are also here, as discussed earlier. All new drawn objects will be placed into a layer called "Others."

- Format menu: Here the user can change the layer options, text style, active properties, and the properties of any selected object.

- Modify menu: Options to delete, move, and edit text can be found here. To delete objects, first select the object and then click on the Delete item in the Modify menu. The Delete key on the keyboard can also be used instead of using the menu item.

  To move an object, first click on the Move item in the Modify menu and then left click to select the objects to be moved; next right click to finish selecting objects and then select the base point to move the objects by left clicking on the base point. Finally drag the object to the desired location and left click to move the object.

  To edit text select the Text item under the Modify menu and then select the text to be modified. Here the user can change the text size and justification as well as edit the text.

Any changes or modification to the graphic can be undone by selecting the Undo item under the Edit menu. A change or modification can be brought back after undoing by selecting the Redo item under the Edit menu.

4.8 Help Menu

The help menu is located on the main window. Two electronic documents available for assistance with CHAMP include this user's manual and the G&S. Both documents are in .pdf format. Adobe Acrobat Reader must be installed to view these documents.